Roadie HD+35K

USER MANUAL

020-100340-02

CHRISTIE®

Roadie HD+35K

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020-100340-02

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This Class A digital apparatus complies with Canadian ICES-003.
Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

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Canadian manufacturing facility is ISO 9001 and 14001 certified.

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For complete information about Christie's limited warranty, please contact your Christie dealer. In addition to the other limitations that may be specified in Christie's limited warranty, the warranty does not cover:

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(b) Projector lamps (See Christie's separate lamp program policy).
(c) Damage caused by use of a projector lamp beyond the recommended lamp life, or use of a lamp supplied by a supplier other than Christie.
(d) Problems caused by combination of the product with non-Christie equipment, such as distribution systems, cameras, video tape recorders, etc., or use of the product with any non-Christie interface device.
(e) Damage caused by misuse, improper power source, accident, fire, flood, lightening, earthquake or other natural disaster.
(f) Damage caused by improper installation/alignment, or by product modification, if by other than a Christie authorized repair service provider.
(g) For LCD projectors, the warranty period specified applies only where the LCD projector is in "normal use." "Normal use" means the LCD projector is not used more than 8 hours a day, 5 days a week. For any LCD projector where "normal use" is exceeded, warranty coverage under this warranty terminates after 6000 hours of operation.
(h) Failure due to normal wear and tear.

PREVENTATIVE MAINTENANCE

Preventative maintenance is an important part of the continued and proper operation of your product. Please see the Maintenance section for specific maintenance items as they relate to your product. Failure to perform maintenance as required, and in accordance with the maintenance schedule specified by Christie, will void the warranty.

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1 Introduction

Every effort has been made to ensure the information in this document is accurate and reliable; however, due to constant research, the information in this document is subject to change without notice.

1.1 Using this Manual

USERS/OPERATORS: This manual is intended for trained users authorized to operate professional high-brightness projection systems, located in restricted areas, such as projection rooms in theatres. Such users may also be trained to replace the lamp and air filter, but cannot install the projector or perform any other functions inside the projector.

NOTE: *Only personnel trained specifically by Christie on lamp replacement and lamp safety may handle the lamp.*

SERVICE: Only Christie accredited service technicians knowledgeable about all potential hazards associated with high voltage, ultraviolet exposure, and high temperatures generated by the lamp and associated circuits are authorized to 1) assemble/install the projector and 2) perform service functions inside the projector.

This manual contains the following sections:

- *Section 1 Introduction*
- *Section 2 Installation and Setup*
- *Section 3 Operation*
- *Section 4 Maintenance*
- *Section 5 Troubleshooting*
- *Section 6 Specifications*
- *Section Appendix A: Serial Communication Cables*
- *Section Appendix B: Menu Tree*
- *Section Appendix C: System Integration*
- *Section Appendix D: Optional Input Modules*

Disclaimer: *Every effort has been made to ensure the information in this document is accurate and reliable. However, due to constant research, the information in this document is subject to change without notice. Christie Digital Systems assumes no responsibility for omissions or inaccuracies. Updates to this document are published regularly, as required. Please contact Christie Digital Systems for availability.*

1.1.1 Labels and Marking

Observe and follow any warnings and instructions marked on the projector.

⚠ DANGER **Danger symbols are used to alert situations where the user will become seriously injured if they do not follow the advice in this section.**

⚠ WARNING **Warning symbols are used to alert situations where there is a situation where a user may be injured.**

⚠ CAUTION **Caution symbols are used to convey information where equipment damage will occur.**

1.1.2 35K Typographical Notations

The following notations are used throughout this manual:

- Keypad commands and PC keystrokes appear in bold small caps, such as POWER, INPUT, ENTER etc.
- References to specific areas of the document appear italicized and underlined. When viewed online, the text appears in blue indicating a direct link to that section. For example, *Section 2 Installation and Setup*.
- References to other documents appear italicized and bold, such as ***Service Manual***.
- References to software menus and available options appear italicized, such as *Main* menu, *Preferences*.
- User input or messages that appear on screen, in status display units or other control modules appear in Courier font. For example. "`No Signal Present`", Login: *`christiedigital`*.
- Error codes, LED status appear in bold, e.g. **LP**, **A1,** etc.
- Operational states of modules appear capitalized, such as switch ON/OFF.

1.2 Purchase Record and Service Contacts

Whether the projector is under warranty or the warranty has expired, Christie's highly trained and extensive factory and dealer service network is always available to quickly diagnose and correct projector malfunctions. Complete service manuals and updates are available for all projectors. Should a problem be encountered with any part of the projector, contact your dealer. In most cases, servicing is performed on site. If you have purchased the projector, fill out the information below and keep with your records.

Table 1.1 Purchase Record

Dealer:
Dealer or Christie Sales/Service Contact Phone Number:
Projection Head Serial Number*:
First Lamp Serial Number:
Lens Serial Number:
Lamp Ballast Serial Number:
Purchase Date:
Installation Date:

* *The serial number can be found on the license label located on the back of the projector.*

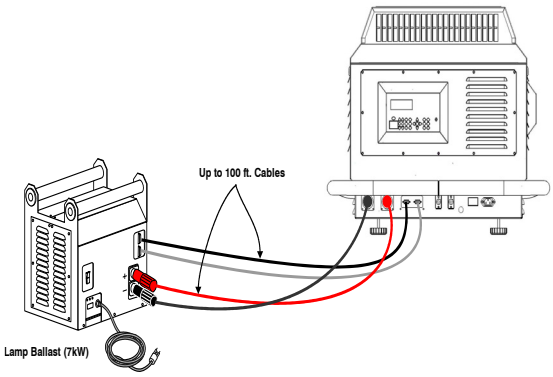
At manufacture, the following Ethernet settings were defined in the projector:

Table 1.2 Ethernet Settings

Default Gateway	N/A
DNS Server	N/A
Projector DLP Address	
Projector Mgmt IP Address	0.0.0.0 (ENABLES USE OF DHCP SERVER FOR IP ADDRESS)
Subnet Mask	255.255.255.0 (FIXED)

1.3 Projector Overview

The Roadie HD+35K is a revolutionary split-body DMD projector utilizing 3-chip Digital Light Processing (DLP) technology from Texas Instruments. Its unique separation of projection head and lamp ballast means both parts can be flown and rigged with greater ease, creating the ideal solution for challenging rental/staging installations and tight spaces. With 2048 x 1080 resolution, light output of 32,500 ANSI lumens (35,000 centre lumens), and 10-bit image processing all standard, Roadie HD+35K images are stunning in their size, brilliance and quality. This tough, user-friendly projector is built for frequent transport and quick setup, even on sprawling networks-perfect for any large audience venue demanding effortless installation, and operation.



1.3.1 How the Projector Works

Processing and Projection

The *Roadie HD+35K* accepts a variety of signals for projection in large screen applications. The High brightness light is generated by a short-arc Xenon lamp, and then modulated by three Digital Micromirror Device (DMDs) panels responding to incoming data streams of digitized red, green, or blue color information. As these digital streams flow from the source, light from the responding "ON" pixels of each panel is reflected, converged and then projected to the screen through one or more front lenses, where all pixel reflections are superimposed in sharp full-color images.

Stacking and Rigging

Rigging a single projector is possible using the projector's handles together with a set of optional rigging clamps and standard rigging techniques. Alternatively, a projector secured in an optional FredFrame™ can be stacked and if desired, flown with another framed projection head using the rigging clamps provided in the optional Rigging Kit. Each frame provides precision roll, pitch and yaw adjustments of the projector for precision image alignments. Corresponding lamp ballasts can be locked up to 100 feet away, flown, or not.

NOTE: *Any overhead suspension used MUST be suitably rated for the weight of the projector.*

1.3.2 List of Components

The following components make up a complete *Roadie HD+35K* system (refer to *Figure 3-1*):

- Projection Head. *Includes*:
  - Line cord
  - Standard IR remote (*includes batteries for IR use, and 25' cable for wired use*)
  - Security keys for lamp and Igniter service access, plus assorted Allen keys
- Lamp Ballast (7 kW)
- Cable kit (*includes 2 lamp power cables and 2 communication/control cables*)
- Choice of lamp kit (*includes protective gear*)
- Choice of lens (*Anamorphic lens and mount are also both optional*)

1.3.3 Key Features

General

- 3-chip electronics with true 2048 x 1080 native resolution
- Split-projector design; ballast is separate from projection head
- Versatile electronic and optical scaling to automatically maximize the display
- 10-bit digital processing (*8-bit for interlaced high-definition video*)
- Can be rigged, flown and/or stacked with optional FredFrame™ hardware

Lamps / Light Output

- Choice of four Xenon bubble lamp sizes and ratings
- Light output of 32,500 ANSI lumens (35,000 centre lumens) (*6kW lamp*)
- Standard achievable contrast ratio 500:1 ANSI, up to 2800:1 full field ON/OFF
- *LampLOC*™ motorized lamp alignment (auto or custom adjustment)
- *LiteLOC*™ for maintaining brightness over time
- Internal electromechanical shutter for quick picture mute and black stand-by
- Optional internal optical components for improved contrast ratio and/or wider color gamut

Inputs

There are two different types of input face plate configurations (model dependant). Refer to *Figure 1-1* and *Figure 1-2*. These configurations may include the following inputs:

- One analog RGBHV/YPbPr input with 5 BNCs
- One DVI-I input for either digital RGB/YCrCb or analog RGB/YPbPr signals
- One analog composite-video input, one analog S-video input
- Built-in multi-standard decoder (NTSC, NTSC 4.43, PAL, PALM, PALN, PAL60, SECAM)
- One Dual SD/HD-SDI input (*installed in one of two optional input slots*)
- Up to 220 MHz pixel rate
- Compatible with all current HDTV formats
- Motion adaptive de-interlacing of 50 fps- and 60 fps-originated standard and high-definition interlaced sources
- Inverse telecine de-interlacing of film-originated standard and high-definition interlaced material with 3:2 drop-down (60 fps) or 2:2 drop-down (50 fps).

For simplicity, this manual refers to the configuration shown in *Figure 1-1* only.

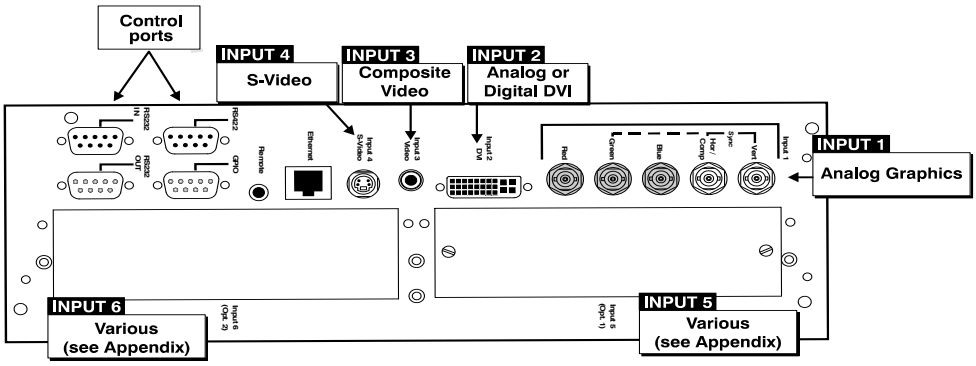


Figure 1-1

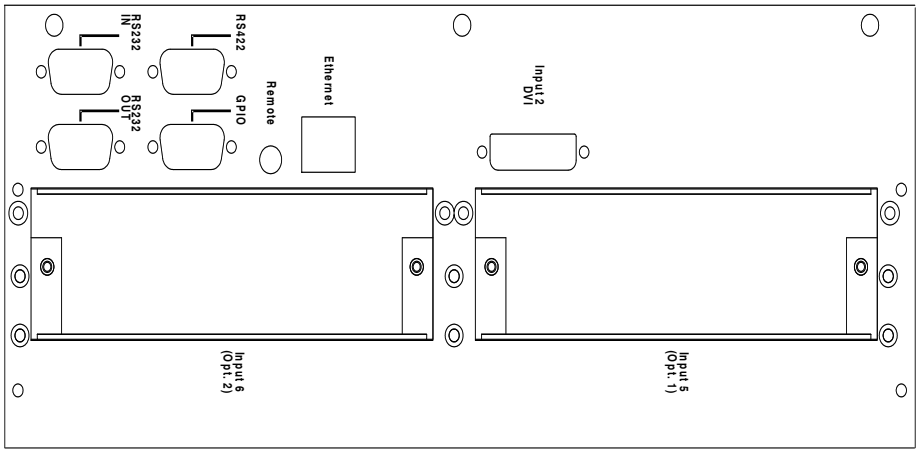


Figure 1-2

Lenses

- Choice of standard high-brightness zoom lenses (ranging from 0.8:1 up to 8.5:1)
- Adjustable zoom, focus, and horizontal and vertical offsets
- Optional lens mount for 1.26x anamorphic lens producing 2.39:1 "scope" images
- Motorized Lens Mount to set focus, zoom, and horizontal and vertical offsets
- Motorized Zoom kit (optional lens accessory) is available for lens upgrade

Special Display Functions (Selected Functionality)

- Auto setup
- Picture-in-Picture (PIP)
- Electronic brightness uniformity, whitelevel edge blending and color matching
- Optional image warping/blending for unusual angles and/or screens (Christie TWIST)

Communications and Diagnostics

- Built-in keypad and convertible IR-to-wired remote
- Front and rear IR sensors
- Ethernet, RS232, RS422, and GPIO control ports
- Built-in ChristieNET™ connectivity and control
- LED for two-digit error codes, plus LCD for text-based status display
- Large status light for long-distance alerts
- Double voltmeters: one for lamp ballast, one for projection head

2 Installation and Setup

This section explains how to install, connect and optimize the projector for delivery of superior image quality. Illustrations are graphical representations only and are provided to enhance the understanding of the written material.

2.1 Projector Quick Setup and Installation

Follow these steps for quick setup of the projector in a basic front-mount position. Refer to the remaining subsections for detailed setup instructions.

⚠ DANGER ***Always power down the projector and disconnect all power sources before servicing or cleaning.***

⚠ WARNING ***Refer to Section 4.1 Safety Warnings and Guidelines.***

2.1.1 Quick Setup

1. **Position the Projection Head.**

   Locate the projection head at an appropriate throw distance (projector-to-screen distance) and vertical position. Refer to *Section 2.3 Projector Position and Mounting* and the Christie website for Throw Distance calculations. Refer to *Section 6.2 Lenses*. Make sure that the projector is level from side-to-side, and is not inverted. The projector's front-to-back and side-to-side tilt can be no more than 15 degrees from horizontal. Position the lamp ballast so that its four cables can reach the rear of the projection head.

2. **Install the Lamp and Lens.**

   Refer to *Section 2.4 Installing Lens, Lamp, and Cooling* for installation instructions.

3. **Connect a Source.**

   Connect your desired source to the appropriate connector(s) on the main Input panel, located on the side of the projector (lens side) as shown in *Figure 2-1*.

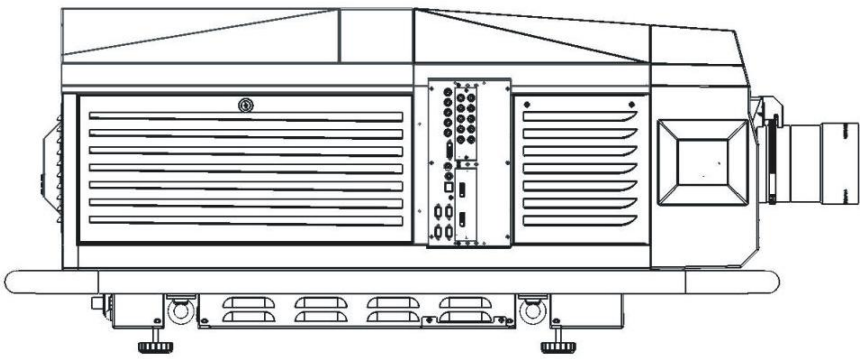


Figure 2-1 Connect to Input Panel

4. **Connect to Lamp Ballast and Power.**

⚠ WARNING ***1) Connect all four cables to the projection head prior to switching the ballast's breaker/power switch ON. 2) Follow all labeling exactly.***

Head to Ballast

Connect all four ballast cables. There are two DC power cables, and two communication/control cables between the projector rear and lamp ballast as shown in *Figure 2-2*.

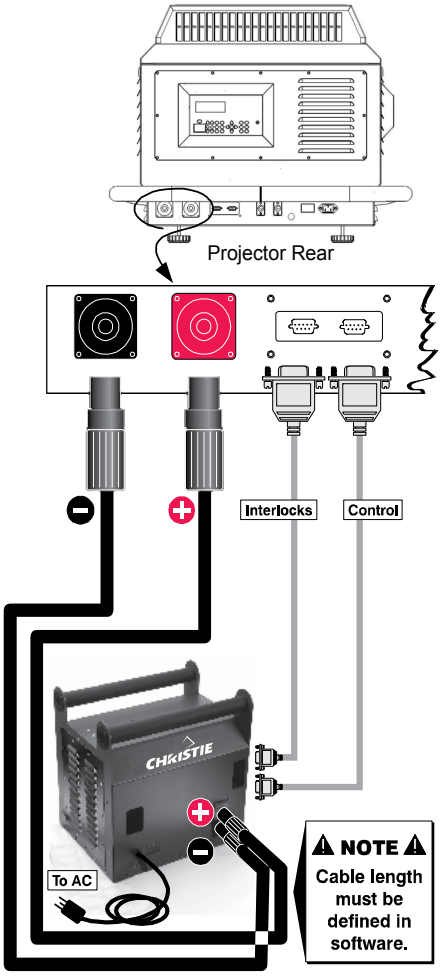


Figure 2-2 Connect Head to Ballast

Ballast to AC

Refer to *Figure 2-3*.

NOTE: *Before connecting the ballast to the AC supply, a Christie accredited service technician must make sure the ballast's plug type and Input Power Range Switch match the line voltage available at the site. Remove the lamp ballast cover to access the switch and determine it's setting-toggle LEFT for 200 VAC supplies, toggle RIGHT for 400 VAC supplies (factory default=200 VAC). Change the plug type as necessary as a delta load with safety ground has no neutral.*

Connect the ballast's integral three-phase 30-amp line cord to your AC supply. You may have to change the plug type for your site.

Confirm that the ballast's three-phase status lights are ON and that the adjacent voltmeter displays an acceptable AC level for your ballast, and region. Refer to *Section 6 Specifications* for details. Then switch the ballast's breaker/power switch to the ON position.

NOTE: *The ballast's internal fan is the only indication whether or not the breaker/power switch is ON. Lights on the ballast indicate only that the ballast is plugged in.*

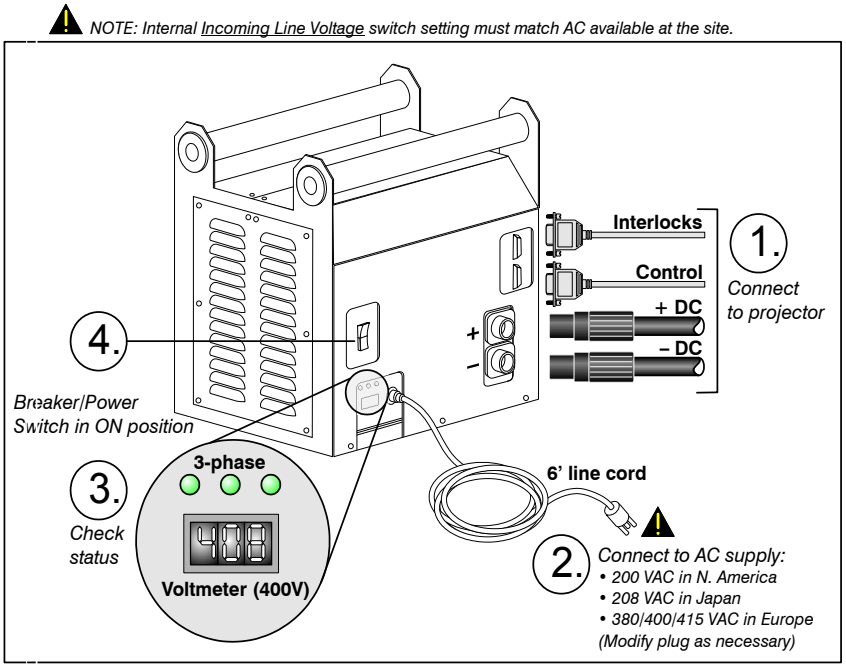


Figure 2-3 *Ballast Connection and Switch On*

Head-to-AC

Connect the Christie-supplied IEC 320 (220V) 15-amp line cord to your AC supply. *Do not substitute other cords*. Input power required is 200 - 240 VAC (nominal), 50/60 Hz @ 3A for 208V. Refer to *Figure 2-4*.

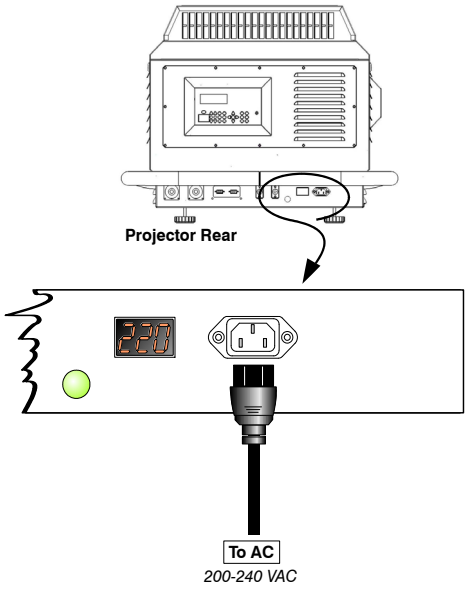


Figure 2-4 Connect Head to AC

⚠ WARNING ***Do not attempt operation if the AC level is not within the specified voltage, and power range for the projection head.***

At this point, the projection head is in a type of "standby" mode only. The voltmeter should display the incoming voltage, the adjacent main PROJ. STATUS light should be yellow, and the light engine compartment fans running, but the rest of the projection head should be OFF.

5. **Set the lamp type.**

⚠ WARNING **EXPLOSION HAZARD.** ***Keep the projection head OFF until you have defined which lamp type is installed.***

Before switching the projector ON and igniting the lamp, you must define in memory which size lamp is installed; otherwise, you risk severely over driving or under driving a lamp.

NOTE: *Ensure that you record the lamp size on the "Lamp Installed" label.*

a. Press MENU. The Status Display at the rear of the projector shows a "Lamp Size" of 2000, 3000, 4500 or 6000 watts, depending on its last setting. The Factory default is 6000 watts.

b. Enter either the Lamp Password. Refer to *Figure 2-5*.

NOTE: *The password is required unless the "Enable Password" service option has been turned OFF.*

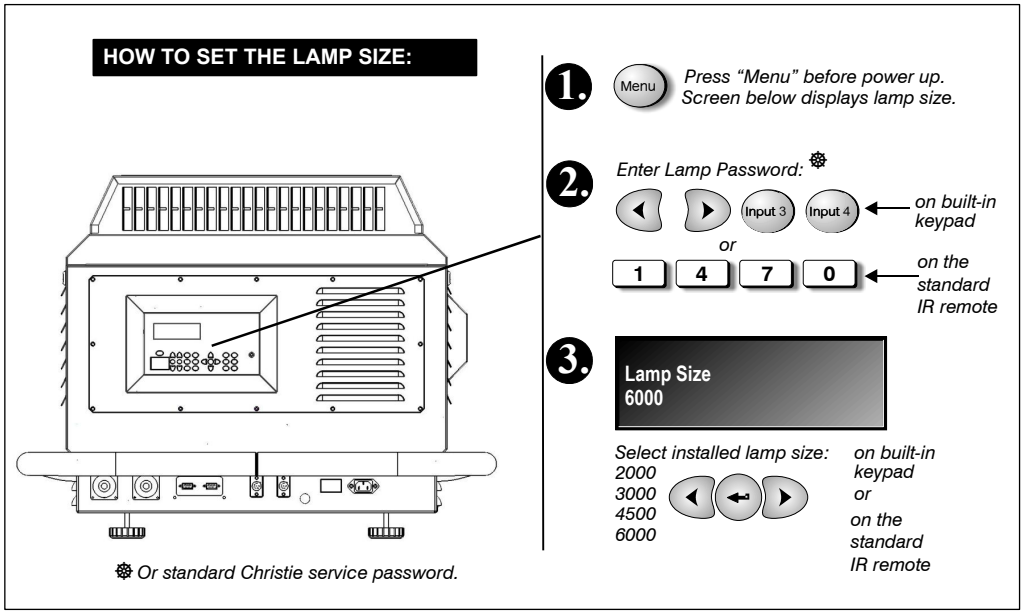


Figure 2-5 Setting Lamp Size

c. Use the UP/DOWN ARROWS to select which lamp is currently installed. Make sure the lamp type is also indicated on the lamp door label.

Once the Status Display shows the correct lamp type, the projector and lamp can be switched ON.

NOTE: *Lamp size can also be changed in the Service menu (Service password required) if the projector is running, but it will not take effect until the next power-up. Whenever possible, define the lamp size **before** igniting the lamp.*

6. **Switch the projector and lamp ON.** Using either the built-in keypad or the standard IR remote, do one of the following to switch the projector ON, and ignite the lamp:
   - press and hold POWER for at least two seconds
   - press POWER and then press the UP or DOWN Arrow key (useful if you are unsure of the present state of the projector)
   - press POWER twice quickly to toggle from the projector's present ON/OFF state

   The main PROJ. STATUS light at the rear of the projector should be green when the projector is up-and-running. For best results, let the projector warm up for about 5 minutes.
7. **Select the source**. Using either the IR remote or built-in keypad, press the appropriate **Input** key (1-6) to display the image for the corresponding source connected as described in Step 3. The display will resize as needed, producing an image as large as possible for the type of source present.
8. **Adjust the Image**. Adjust the more common image settings, such as Brightness, Contract, Gamma, etc. using the keys directly on the standard IR remote.

   You can also access the Menu system and adjust these and other image settings by pressing MENU on the standard IR remote.

9. **Adjust the lens.** Use the **Focus** button on the standard IR remote or the built-in keypad to focus the image. Use the **Zoom** buttons to increase or decrease image size (not available with fixed 0.8:1 and 1:1 lenses). Use the **Lens Shift** button, and the ARROW keys to shift the image location. Refer to *Section 3.14 Working with the Lenses* on how to use the motorized lens mount and *Section 2.4.1 Lens Installation* for instructions.
10. **Set Cable Length.** In the *Lamp* menu, set the "Cable Length (m)" slidebar to match the length of the high-voltage DC cables connected between your lamp ballast and projection head. This regulates the voltage drop that occurs over distance, and ensures that adequate voltage reaches the lamp. Particularly in projectors rented for temporary installations, this setting may have to be changed from its last use. Adjustment range is 2-30m (6½-100 ft.).

    Setting the "Cable Length" also allows you to achieve the same lumens, regardless of cable length. However, to drive the lamp at maximum power, even with the shorter ballast cables, set "Cable Length" to maximum power. Due to the resistance losses that occur with longer ballast cables, the ballast does not achieve the same maximum power.

    Press AUTO SETUP and/or MENU to refine other display parameters as necessary. Refer to *Section 3.6.3 Image Settings Menu*.

2.2 Installation Considerations

Although the *Roadie HD+35K* is carefully engineered to deliver exceptional quality, high brightness, and high resolution output, your final display results could still be compromised if the projector is improperly installed. This subsection discusses issues to consider before proceeding with a final installation. Even for temporary installations, this information helps you to better understand what may be done to ensure optimized images.

2.2.1 Screen Type

Front Screen Installations

This projector is intended for use with flat or slightly curved screens, front or rear, ranging from about 1.5 meters (5 ft.) to 45 meters (150 ft.) wide. Although flat screens generally offer a low gain similar to a matte white wall paint-approximately 1 with a viewing angle just under 180°- and are considered most effective when ambient light is low, this difference in gain may be negligible given the very high light output from this projector. In addition, incident light reflects equally in all directions so the audience can see the display from more acute viewing angles. See *Figure 2-6*.

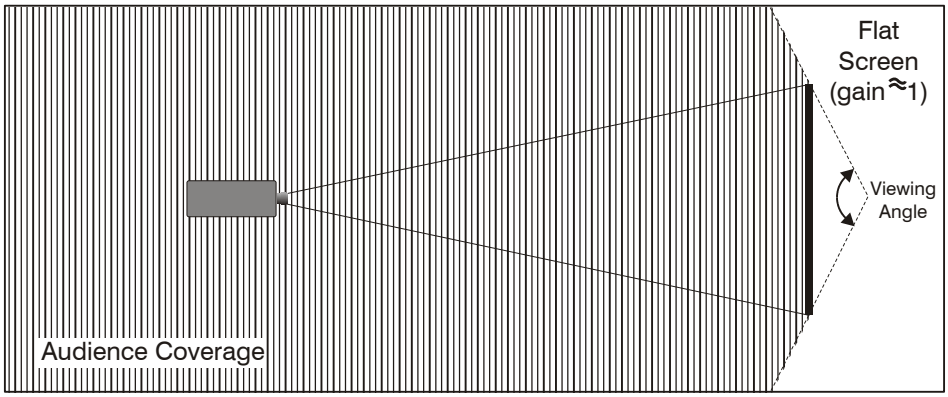


Figure 2-6 Audience Coverage with a Flat Screen

NOTE: *Roadie HD+35K lenses are designed primarily for use with flat screens, but the projector's depth-of-field range allows the lens to be focused on mildly curved screens as well. While focus remains sharp in the corners, there may be significant pincushion distortion, primarily at the top of the screen.*

Rear Screen Installations

There are two basic types of rear screens: diffused and optical. A diffused rear screen has a surface that spreads the light striking it. Purely diffused screens have a gain of less than 1. The main advantage of the diffused screen is its wide viewing angle, similar to that of a flat screen for front screen projection. Optical rear screens take light from the projector and redirect it to increase the light intensity at the front of the screen. This reduces it in other areas, and creates a viewing cone similar to that of a curved front screen installation.

To summarize, optical screens are better suited for brightly lit rooms where the audience is situated within the viewing cone. Diffused screens may be better suited when a wide viewing angle is required, but there is low ambient room lighting.

2.2.2 Screen Size

Screen size (image size) may be up to 150 feet across, depending on your lens and ambient light level. Choose a screen size appropriate for your lens and application. Keep in mind that if the projector will be used to display much text information, the image size must allow the audience to recognize all text clearly. The eye usually sees a letter clearly if eye-to-text distance is less than 150 times the height of the letter. In other words, small text that is simply located too far from the eye will be illegible no matter how sharply and clearly it is displayed.

NOTE: *Screens with aspect ratios (proportion) of 4:3 are typically specified by diagonal size, but screens having other aspect ratios, such as the 2048 x 1080 of the Roadie HD+35K, are usually specified by their horizontal width. See Table 2.1 below:*

Table 2.1 Matching Lens to Screen Size

Lens Type	Screen Width(< - >)
0.8:1 fixed	5 - 3 ft.
1:1 fixed	14 - 150 ft.
1.25 - 1.45:1 zoom	10 - 121 ft.
1.45 - 1.8:1 zoom	8 - 102 ft.
1.8 - 2.4:1 zoom	6 -83 ft.
2.2 - 3.0:1 zoom	5 - 66 ft.
3.0 4.3:1 zoom	3 - 49 ft.
4.3 - 6.0:1 zoom	2.5 - 35 ft.
5.5 -8.5:1 zoom	2 - 27 ft.

2.2.3 Screen Aspect Ratio

Aspect ratio describes the proportion of the display and is expressed as the ratio of width to height, such as "5:4" or "16:9". Typical aspect ratios range from 1.25 to 2.35, the higher the value, the wider or "less square" the image. *Refer to Table 2.2* below.

Table 2.2 Typical Aspect Ratios

Application	Aspect Ratio
SXGA	1.25 (5:4)
35mm filmstrip	1.32 (4:3)
NTSC Video/XGA	1.33 (4:3)
PAL Video/XGA	1.33 (4:3)
HDTV Video	1.78 (16:9)
Letterbox Video/"Flat"	1.85 (2048 x 1080)
Roadie Native Resolution	1.89 (2048 x 1080)
Cinemascope	2.35

Although image size and aspect ratio can be adjusted using projector software, it is still ideal to use a screen with an aspect ratio that closely matches your likely source material. You can then more easily fill the screen with the image without restricting either image size or content. For example, standard video from a VCR has a 4:3 ratio (approximately) and can fill a 4:3 screen without side-to-side stretching, whereas a high-definition signal with a 16:9 aspect is largest on a 16:9 screen.

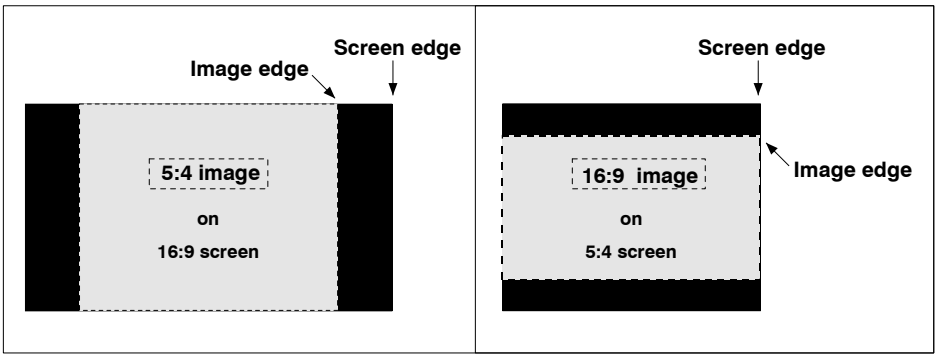


Figure 2-7 Aspect Ratios: Image vs. Screens

As shown in *Figure 2-7*, an obvious mismatch between source material and screen is characterized by "black bars" on both sides of the image (if the screen is wider than the source material) or above and below the image (if the source material is wider-typically called a letterbox display).

Alternatively, if the area of unused pixels is considered minimal, you may prefer to use the projector's software control to slightly stretch the image either horizontally or vertically-enough to utilize the remaining pixels while not noticeably distorting the image.

Using a Cinema "Flat" Screen (1.85 aspect ratio)

By default, source signals closely matching the projector's 2048 x 1080 display area will fill this area accordingly. Signals with lower aspect ratios will automatically scale to be as large as possible while maintaining their original aspect ratio. For details on resizing behavior, refer to *Section 3.6.3 Image Settings Menu*.

Displaying both “Flat" and "Scope"

As an example, two standard types of displays (flat and scope) differ in their width-to-height aspect ratio as shown below:

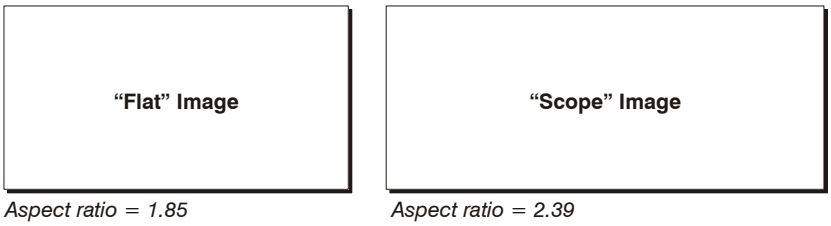


Figure 2-8 Typical Wide Formats

Achieving either of these displays from a variety of incoming source material (that may or may not be in the same format) depends on proper settings in the projector as well as certain room conditions.

Projector Variables: Electronic and Anamorphic Resizing

The native resolution of the projector (1.89) closely matches the aspect ratio of "flat" source material (1.85). Wider scope material, however, may be "squeezed" electronically that is, it is distorted into a narrower area (characterized by unusually thin people) so that its pixels can then be stretched horizontally through the anamorphic lens to regain the full and properly proportioned 2.39 display. This optical widening can stretch the image by approximately 25%. See *Figure 2-9*.

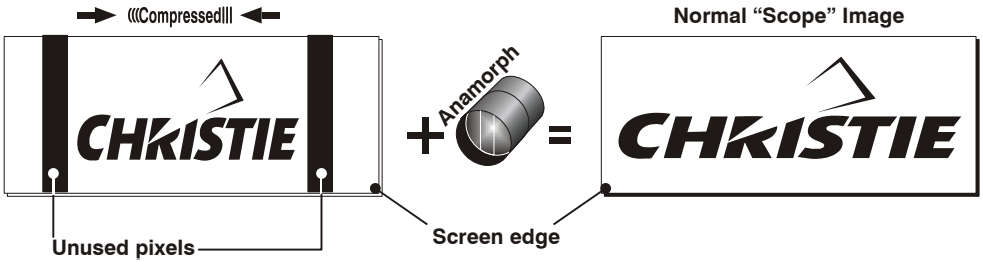


Figure 2-9 Typical Method for Achieving “Scope”

Masking Options

In order to conveniently present different types of incoming data-for example, flat vs. scope-on a single screen, you can use physical masking to cover the unused edge(s) of the screen. These movable panels are most commonly installed along the top edge of the screen, changing the height of the screen, but not its width, and are most frequently used in permanent installations.

The screen shown in *Figure 2-10* also has a bottom mask:

- Add masks for "scope" displays
- Remove masks for "flat" displays

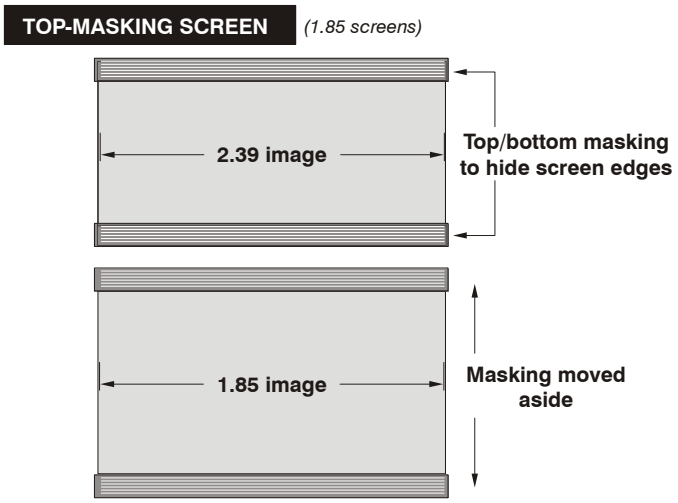


Figure 2-10 Top Masking for Scope Images

Alternatively, masks may be installed at each side of the screen in order to change the width of the screen, but not its height.

- Add masks for "flat" displays
- Remove masks for "scope" displays

In some cases, the room will have both side and top/bottom masking installed. This arrangement is the most flexible of all.

Refer to *Figure 2-12* for a summary of the basic factors affecting wide displays in a variety of rooms.

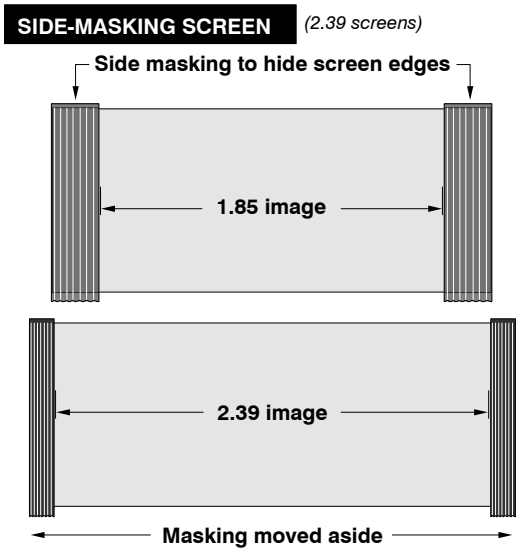


Figure 2-11 Side Masking for Flat

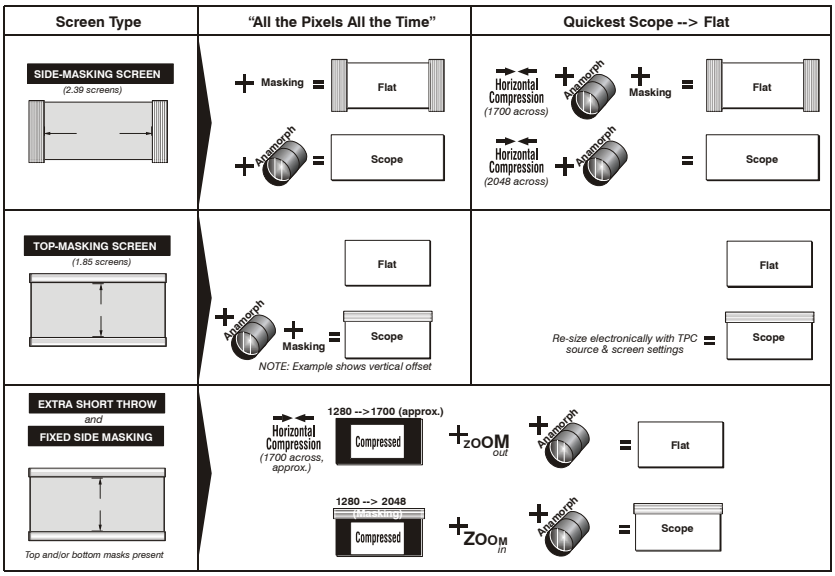


Figure 2-12 Switching between Flat and Scope Displays

2.2.4 Ambient Lighting

The extraordinary brilliance of this projector is certainly well suited for locations where ambient lighting might be considered less than ideal for projection. Even a typical room or large auditorium fully lit with ceiling lights and windows rarely requires special attention. Contrast ratio in your images will be noticeably reduced only if light directly strikes the screen, such as when a shaft of light from a window or floodlight falls on the image. Images may then appear washed out and less vibrant.

In general, avoid or eliminate light sources directed at the screen.

2.2.5 Other Considerations

Other considerations and tips that can help improve your installation:

- Keep the ambient temperature constant and below 35°C (95°F). Keep the projector away from heating and/or air conditioning vents. Changes in temperature may cause drifts in the projector circuitry that may affect performance.
- Keep the projector away from devices that radiate electromagnetic energy such as motors and transformers. Common sources of these include slide projectors, speakers, power amplifiers, elevators, etc.
- Choose the best screen size for the application. Since more magnification reduces brightness, use a screen size appropriate for the venue, but not larger than required. Installing a large screen in a small room is similar to watching television at a close range; too large a screen can overpower a room and interfere with the overall effect. A good rule of thumb is to be no closer than 1.5 times the width of the screen.

2.3 Projector Position and Mounting

Installation type, the available screen, and ambient lighting all affect where the projector should be positioned. In addition, both throw distance (the distance between the projector and screen) and vertical position (the height of the projector in relation to the screen) must be determined for every new installation. Both depend on the screen size and lens type you are using. Make sure that the room can accommodate the required location of the projector for the chosen screen size.

2.3.1 Throw Distance

Throw distance is the distance between the *projector* and the *screen* (see *Figure 2-13*). For any installation, placing the projector at an accurate throw distance is necessary in order for the image size to closely match your screen. The farther the projector is from the screen, the larger the image. With zoom lenses, you'll want to know the approximate minimum and maximum image sizes possible from a given throw distance so that the most appropriate lens is installed at the site (throw distance/screen width = throw ratio).

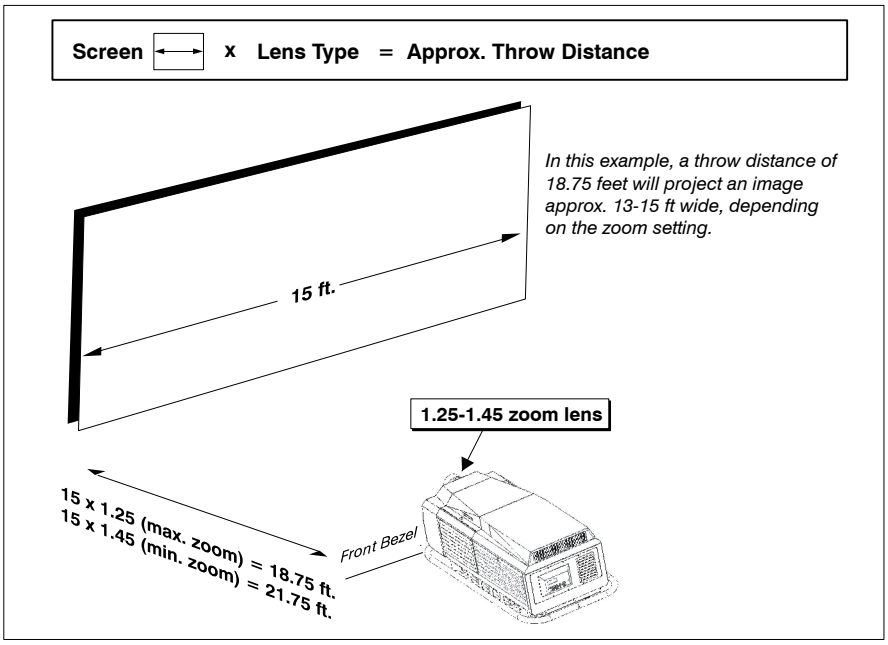


Figure 2-13 Estimating Throw Distance: Example

NOTE: *If your projector is slightly tilted in relation to the screen, typical for large venues and/or elevated installations, throw distance still represents the smallest measurement between the screen and projector.*

As shown in *Figure 2-13*, the throw distance is approximately equal to the horizontal width of the screen multiplied by the type of lens you are using. For example, if you are using a 1:1 lens, proper throw distance will be approximately the same as screen width. Once you know your screen width and type of lens, you can estimate throw distance needed. Or, if you know throw distance, you can determine what images sizes are possible with a given zoom lens.

IMPORTANT! *For proper placement in any installation, use the lens and screen size to calculate the precise throw distance using the tables provided in the* ***Dealer Section of the Christie Website, PN 020-100395-xx****. In addition, please keep in mind that due to lens manufacturing tolerances for lens focal length, actual throw distance can vary ±5% or more between lenses described as having the same throw ratio.*

2.3.2 Vertical & Horizontal Position

Refer to the offsets shown in this section to help determine how high or low to install the projector in relation to the center of the screen, and/or how far off to one side.

Vertical Position

Describes the elevation of the projector in relation to the screen. For many typical rental/staging installations, the projector is mounted above screen center. An ideal vertical position helps to ensure that images are accurately rectangular in shape rather than distorted into a keystoned shape with non-parallel sides, that both image focus, and brightness remains optimized.

NOTE: *Proper vertical position is recommended, although vertically keystoned images (i.e., those with sloping sides) can be corrected in software. Refer to Section 3 Operation.*

The image can be offset vertically (shifted above or below lens center) by using the built-in keypad or the standard IR remote. Starting with no offset, the 2048 x 1080 image from this projector can be moved by a distance of up to ±100% of the image height (depending on the lens), resulting in the entire image being displayed above or below lens center. Refer to *Figure 2-12*.

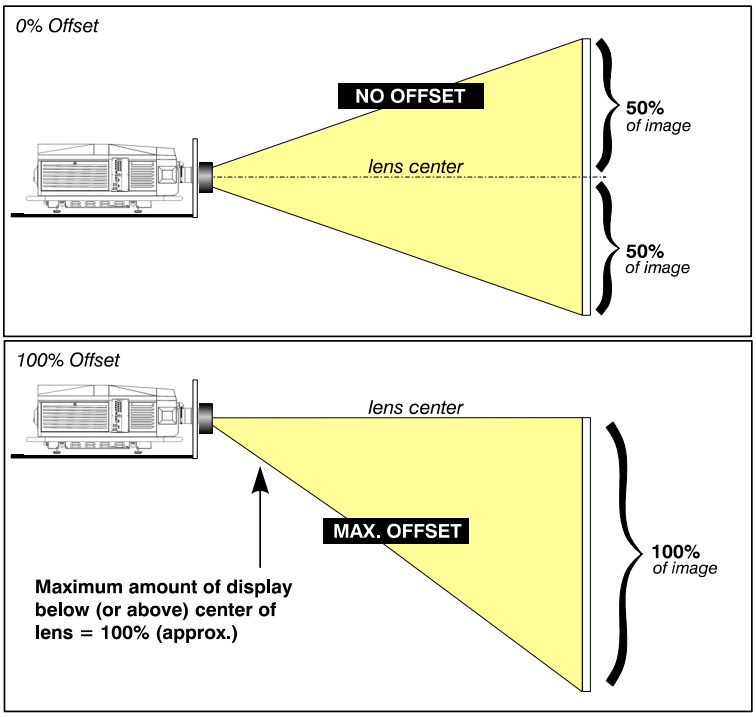


Figure 2-14 Vertical Offset Range

NOTES: 1) *Assumes full 2048 x 1080 display.* **2)** *Recommended offset range can sometimes be exceeded, however this may affect image quality.* **3)** *Due to manufacturing tolerances, an offset range can vary ±5% or more between lenses described as having the same throw ratio, between projectors, and with any lens/projector combination. 4) Simultaneous horizontal and vertical offset can limit the adjustment range of each, as can long throw distances.*

ALTERNATIVE METHOD OF DESCRIBING VERTICAL OFFSET

Offset can also be specified as the **distance traveled** from lens center (such as 270 pixels) and expressed as a percentage (270 pixels=50%) of **half of the image height**. This concept of image movement is illustrated in the example below:

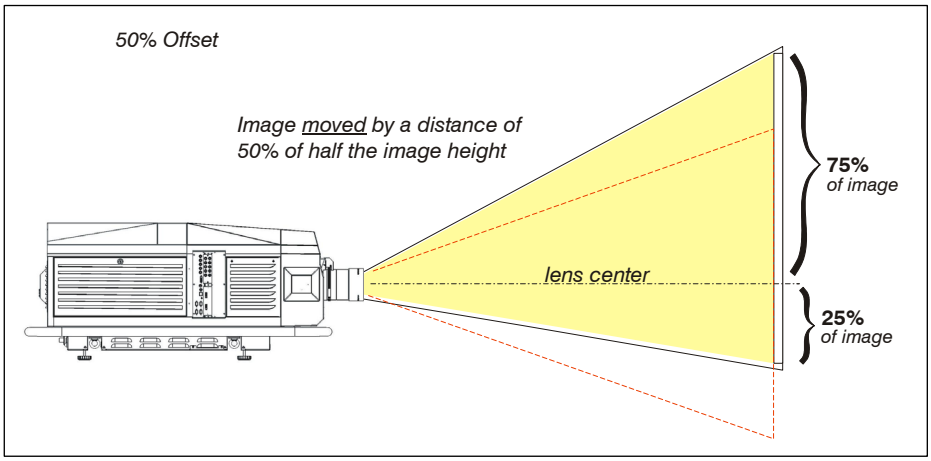


Figure 2-15 Example of Alternative Offset Specification

For any projector, if you find that you cannot raise or lower the image enough using mechanical vertical offset, try adjusting V-Position in the *Size and Position* menu when displaying at less than the minimum size (see *Section 3.6.3 Image Settings Menu*). If images remain keystoned or exhibit uneven brightness, the projector may simply be too high or low in relation to the screen. Relocate for optimized performance.

Horizontal Position

The image can be offset horizontally (shifted left or right of lens center) by using the built-in keypad or the standard IR remote. Starting with no offset, the 2048 x 1080 image from this projector can be moved by a distance of up to ±35% of the image width (depending on the lens).

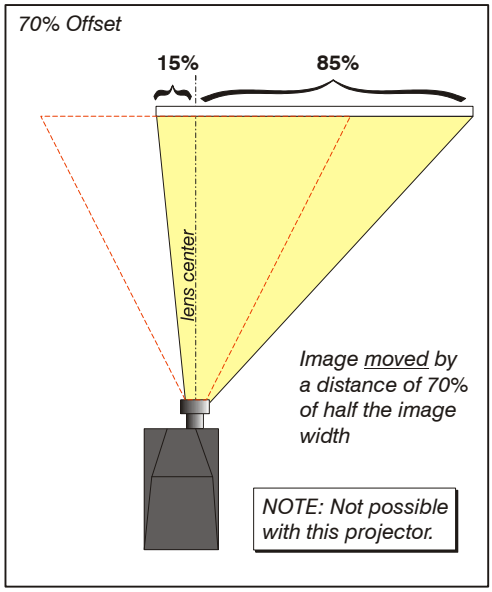


Figure 2-16 Horizontal Offset Range

NOTE: *The positioning shown in Figure 2-16 is often mistakenly referenced as "70% offset", but it is not-it is 40% offset derived as 432/1080 x 100. A 70% offset is explained below.*

ALTERNATIVE METHOD OF DESCRIBING HORIZONTAL OFFSET

Horizontal offset can also be specified as the *distance* traveled from lens center and expressed as a percentage of *half of the image width*. For example, an offset spec of 70% means a centered image can be moved by a distance of 540 pixels, resulting in 85% of the image projected to one side of lens center and 15% on the other. See *Figure 2-16*.

NOTE: *Example only. Beyond range for this projector.*

2.3.3 Floor Mounting and Leveling

For front projection without suspending, mount the projector on a strong supporting structure or cart. Take special care if using a mobile cart-avoid sudden stops, force and uneven surfaces that may cause the top-heavy cart to lurch and overturn.

Make sure your mounting structure is reasonably level, and then adjust one or more projector feet as necessary to fine-tune.

⚠ WARNING ***Do not invert this projector.***

Adjusting the Feet

For installations on a floor or suitable supporting structure, a single projection head should rest firmly on its feet. To adjust the height and level of the projector, extend or retract the feet by rotating them. Refer to *Figure 2-17*.

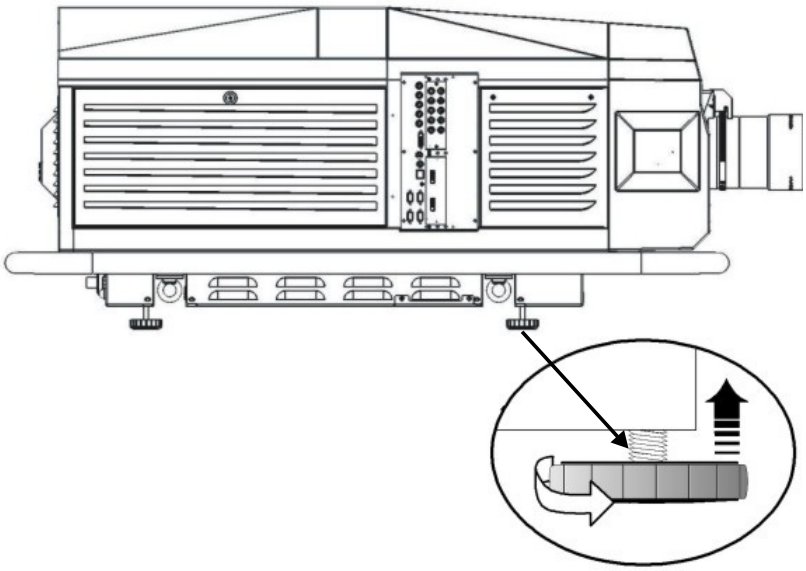


Figure 2-17 Adjusting the Feet

2.3.4 Tilting and Special Orientations

Tilting

For any installation, you can tilt the front end of the projector up or down as much as 15°.

Likewise, side-to-side tilt must not exceed 15° (see). This limit ensures safe lamp operation and proper position of the liquid cooling reservoir in the projector.

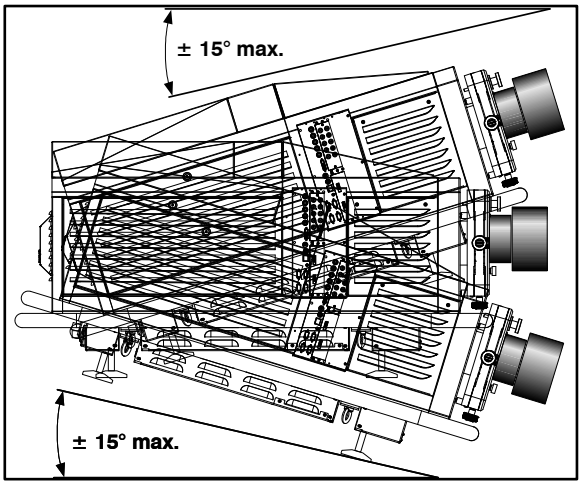


Figure 2-18 Front End Tilt

⚠ WARNING ***Tilt only as shown in Figure 2-18 and Figure 2-19.***

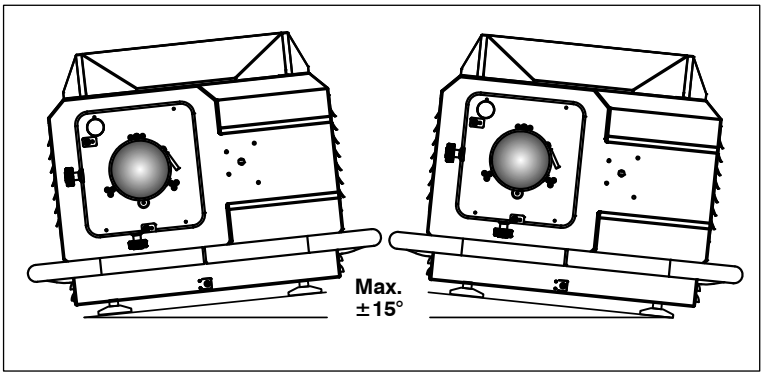


Figure 2-19 Side to Side Tilt

Special Orientations

Since this projector cannot be inverted or tilted beyond 15°, all installations are typically front-mount or rear-mount and require the "Front" or “Rear” Image Orientation setting in the *Configuration* menu.

2.3.5 Hoisting and Stacking

For most installations, you will likely have to safely lift or hoist this projector-or a stack of two projectors-into place. Keep in mind the following critical safety guidelines for all handling of the projector.

Carrying/Moving the Projection Head

Four or more people can lift and hand-carry one projection head a short distance using the handles or the optional FredFrame™ , if installed. **NEVER** carry a stack of projectors.

Hoisting/Rigging a Single Projection Head

A single projection head can be hoisted and/or suspended using its handles, a set of rigging clamps (#113-102101-xx), and appropriate rigging and safety cables. If desired, the lamp ballast can also be flown from its integral rigging bars. To hoist, stack or "fly" a stack of projectors you must use the optional ***FredFrame™***. Refer to *Using the FredFrame™* described below.

Read the following safety warning before hoisting/ rigging ONE projection head. Refer to 020-100133-XX for more information.

⚠ DANGER ***Any overhead suspension used MUST be suitably rated for the weight of the projector. The projector's weight is 435 lb / 197.3 kg.***

⚠ WARNING ***Maximum load rating of the projector's handles is 435 lb / 197.3 kg. Use straps and/or cabling with load capacity adequate for the total projector and handles when lifting/hoist. Never exceed the load rating specified.***

⚠ WARNING ***Use the projector's handles for hoisting/rigging ONE projector only. Never try to carry more than one projector.***

⚠ WARNING ***Remove the projection lens before hoisting/rigging.***

When hoisting/rigging a single projector using its handles, do the following:

1. Remove the projection lens. Refer to *Section 4.5 Replacing a Lens*.
2. Clamp the 4 rigging clamps to the projector's handles staying within the assigned rigging zones. Refer to *Figure 2-20* and *Figure 2-21*, and allow a minimum of 12 inches between clamps for proper stability. Do not tighten the cross bolt of the clevis arms to ensure the rigging clamp can swivel freely.

NOTE: *Symmetrical placement of the clamps on each side of the handles is strongly recommended.*

3. Secure the other end of each clamp to the primary support structure.
4. Secure the projector with an additional two safety straps. Using one safety strap per crossbeam, route the strap through the bottom 2 eyebolts and bring them up, and around the outside of the handles. Refer to *Figure 2-21*.
5. Install the projection lens and secure it with the safety ring and tether strap as described in *Section 2.4 Installing Lens, Lamp, and Cooling*.

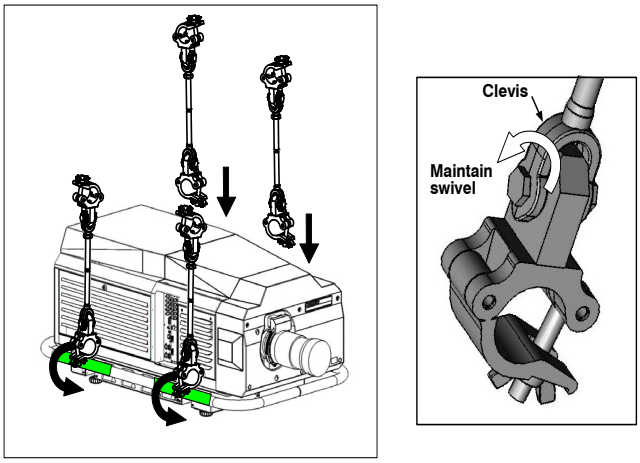


Figure 2-20 Securing Clamps to Projection Head

⚠ WARNING ***1) CRITICAL SAFETY is a minimum of 4 rigging clamps are required for a single projector. 2) Always use redundant safety straps/cables. 3) Observe load ratings and all local applicable codes.***

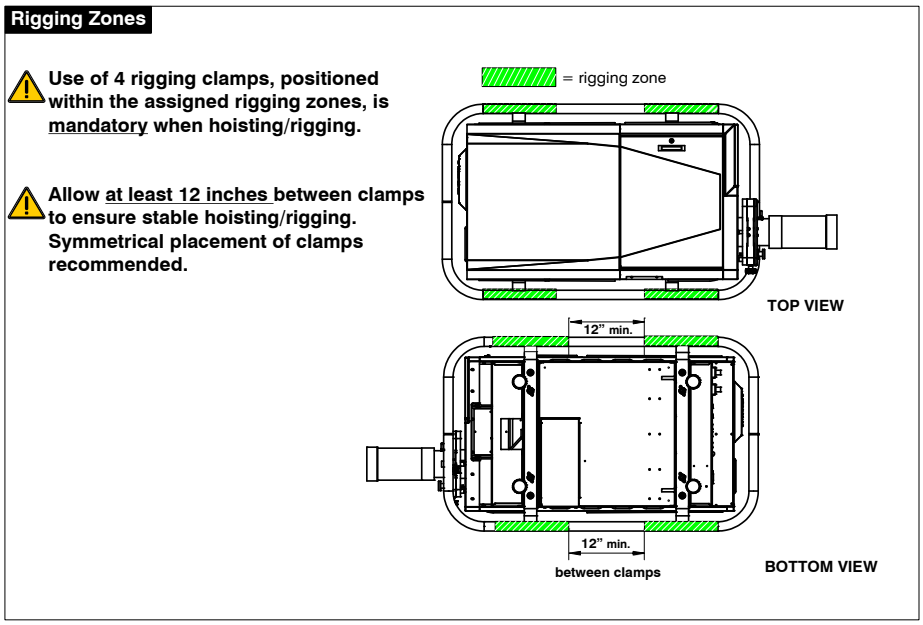


Figure 2-21 Rigging Zones on Projector Handles

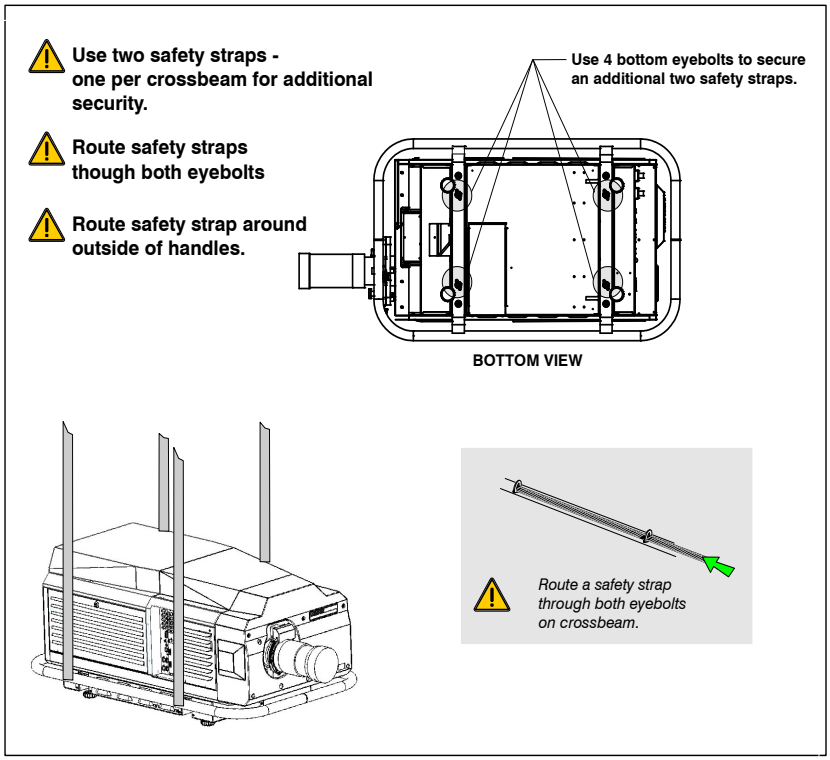


Figure 2-22 Using Safety Straps

Using the FredFrame™

To hoist, stack and/or "fly" projectors using the optional FredFrame™ (PN 38-814007-xx), you must first remove the handles and properly secure each projection head within a FredFrame™. Then using appropriate rigging clamps (PN 38-814007-51), you can raise and/or suspend the projector assembly. If desired, the lamp ballast can also be hoisted and flown from its integral rigging bars. Follow the instructions provided with the FredFrame™ kit.

⚠ WARNING ***1) Use straps and/or cabling with load capacity adequate for the total projection head and frame weight. 2) Remove the lens before hoisting. 3) Critical safety means to never exceed the Load Rating specified in the FredFrame™ Stacking & Rigging Kit instructions.***

Refer to the complete instructions for using the FredFrame™. These include all installation instructions as well as mechanical adjustment procedures for proper image alignment.

Using a Fork Lift

⚠ WARNING ***Do not attempt to use a forklift without first installing the forklift rails on the bottom of the FredFrame™, otherwise the base of the projector may crush and damage internal components.***

Strong extruded rails that mount to the bottom of the FredFrame™ accommodate forks from a forklift, and are mandatory for this method of transport. Do not lift the projection head with equipment unless the FredFrame™ and forklift rails are installed. The projector's handles must be removed when installing the FredFrame™. Follow the instructions provided with the FredFrame™ kit.

Stacking

To stack two projection heads together, you must first secure each head within a FredFrame™, and then secure all corners of the frames together using 4 stacking pins (provided). Do not stack more than 2 projection heads together, and do not attempt to move stacked projectors without proper transport equipment. Refer to the instruction provided with the FredFrame™ Kit for stacking.

2.4 Installing Lens, Lamp, and Cooling

It is recommended that the lens and lamp installation be handled at the last possible moment to ensure that no damage is done to the projector due to movement.

2.4.1 Lens Installation

Primary Lens

1. Remove the rear lens cap from the lens.
2. Rotate the lens clamp to the **OPEN** position.
3. Orient your primary lens with its **UP** label at the top and fully insert the assembly straight into the lens mount opening all the way back, without turning.

NOTES: ***1)*** *Ensure that the Zoom connector is fully engaged.* ***2)*** *When installing the lens, ensure that the lens is* ***NOT*** *inserted at an angle, as this can cause damage.* **3)** *Ensure that the lens is fully back to seat properly within the lens mount.*

The following steps are **IMPORTANT!** and necessary to ensure your safety and that of the lens so it does not fall out.

4. Lock the lens assembly in place with the lens clamp **DOWN**.
5. For added security, tether the lens to the projector by wrapping it around either the handle or FredFrame™ if flown. This step is not required if projector is floor-mounted.

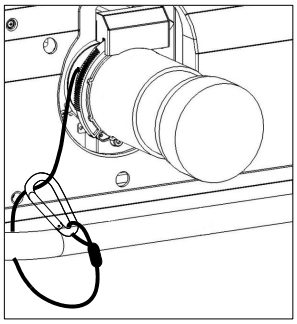


Figure 2-23 Tether Lens to Projector

⚠ WARNING ***In the event a lens is dropped, the lens tether and clamp assembly may become stressed, and therefore must be replaced before continuing its use. Failure to do so could result in injury or death.***

6. Remove the front lens cap.
7. Calibrate the lens. See *Figure 2-24*. For more information, refer to *Section 3 Operation*.

⚠ CAUTION ***Lens calibration must be performed each time a new lens is inserted or after performing manual lens mount adjustments. This is critical to the projector functioning properly. Failure to do so could result in damage to the lens mount, the projector, or the projection lens.***

To calibrate the lens, select the *Configuration > Diagnostics and Calibration > Lens Calibration > Reference Calibration* option from the *Main* menu. This allows the lens to find the center points of each axis (focus, zoom, horizontal, and vertical), the end stops, and other motion parameters.

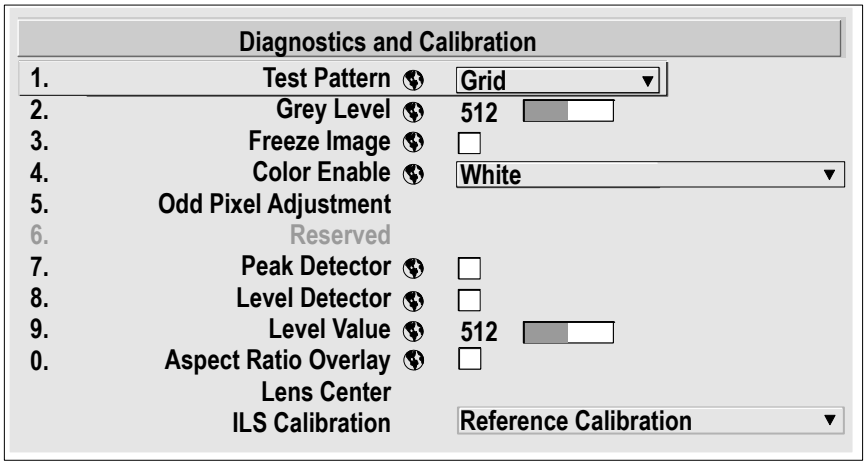


Figure 2-24 Diagnostic and Calibration Menu

Lens Center Command

This command moves the lens horizontal and vertical motion to the center of travel.

NOTES: 1) *The lens seals the projection head, preventing contaminants from entering the area of main electronics. Never attempt to operate the projector without a lens installed. During transport and installation, install a lens plug.* **2)** *Always re-install a lens in its previous "UP" orientation, otherwise boresight may require re-adjustment.*

Anamorphic Lens Installation (Optional)

NOTE: *The optional anamorphic lens mount is required for use of the 1.26x anamorphic lens, producing 2.39:1 "scope" images. However, the lens mount cover must be removed when installing the anamorphic lens mount and in order to the use the MALM.*

If the anamorphic lens is used, it is recommended that you add the lens and its mount before final leveling or making any adjustments (i.e. boresight, etc.). Install only for those installations requiring full-size 2.39:1 "scope" display (mostly side-masking screens) obtained by optically stretching a pre-squeezed image.

1. **Install the Anamorphic Lens Mount on the Projector.**

   At the front of the projector, install the anamorphic lens mount hardware as described in the instructions provided with *Christie's Anamorphic Lens Mount Kit*.

2. **Install the 1:26x Anamorphic Lens.**

   Clamp the 1.26x anamorphic lens mount in place, following the instructions provided with the anamorphic lens mount kit.

2.4.2 Install First Lamp

⚠ WARNING **Explosion Hazard.** ***Wear authorized protective clothing whenever the lamp door is open. Never apply a twisting or bending force to the quart lamp body. A Christie accredited service technician is required.***

1. Open the lamp door and remove lamp cooling compartment door.

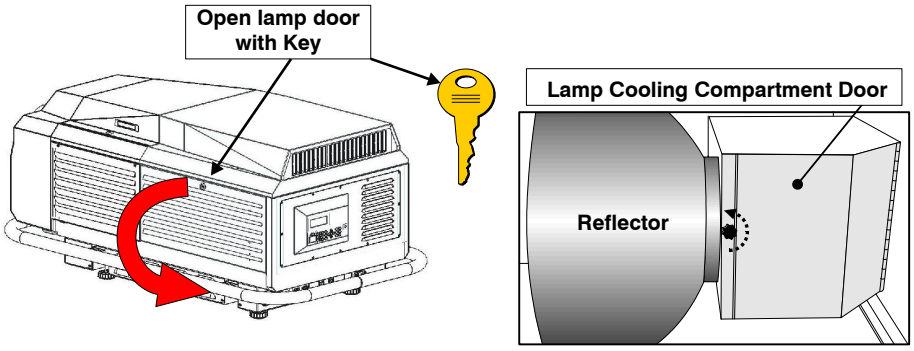


Figure 2-25 Open Lamp Door and Cooling Compartment

2. Install one of the following lamps in the projection head, depending on your model and site:
   - 2.0 kW*
   - 3.0 kW*
   - 4.5kW*
   - 6.0 kW*

NOTE: *3-phase Ballast Required.*

* Available as CDXL (maximum performance) or original CXL.

Refer to *Section 6 Specifications.*

1. **Check lamp cradle (Anode end) location for your lamp.**
   - For 4.5 or 6.0 kW lamps, the lamp cradle should use the holes farthest from the reflector (factory default).
   - For 2.0 or 3.0 kW lamps, use the holes closest to the reflector.
2. **Install lamp.**

   Refer to *Section 4.4 Replacing the Lamp & Filter*, Steps 7-11 for installation instructions.

NOTES: 1) *Observe all warnings, and wear protective clothing and shielding.* **2)** ***Do Not*** *forget to properly mark the "Lamp Installed" label on the lamp door to indicate current lamp size.*

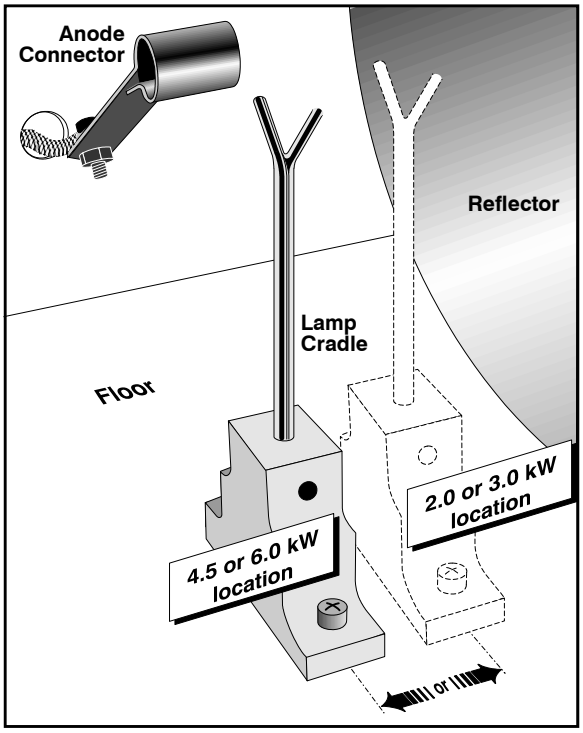


Figure 2-26 Move cradle back for 2.0 or 3.0

Liquid Cooling

During operation, a closed loop of flexible tubing circulates liquid coolant from a small reservoir to critical electronic components located near the front of the projection head. The coolant (a 50/50 mix of distilled water and ethylene glycol) should fill slightly more than half of the reservoir to ensure adequate circulation. The reservoir, which is located in the Igniter compartment, is factory-filled and does not require draining for transit. Check regularly.

2.5 Connecting Sources

Sources connect to the Input Panel located on side of the projector closest to the lens. Refer to *Figure 2-27*.

The upper left corner (**INPUT 1**) typically accepts an RGB signal from an external analog RGB source, or it can also be used for YPbPr signals. Just beneath these BNCs, the DVI-I connector (**INPUT 2**) accepts digital or analog display signals from a computer. An HDMI to DVI adapter cable accepts digital signals from a Blu-Ray or DVD player. Connect analog composite video at **INPUT 3** or S-video at **INPUT 4** from devices such as VCRs or DVD players. At **INPUT 5,** connect serial digital YCbCr (4:2:2) or compatible SMPTE signals (note this module can be moved to **INPUT 6.** if desired).

There are also several optional interfaces available for connecting other sources, these interfaces slide into either Input 5 or Input 6, and can be removed or installed while the projector is running.

NOTE: *Some Input options are not available with some projector models.*

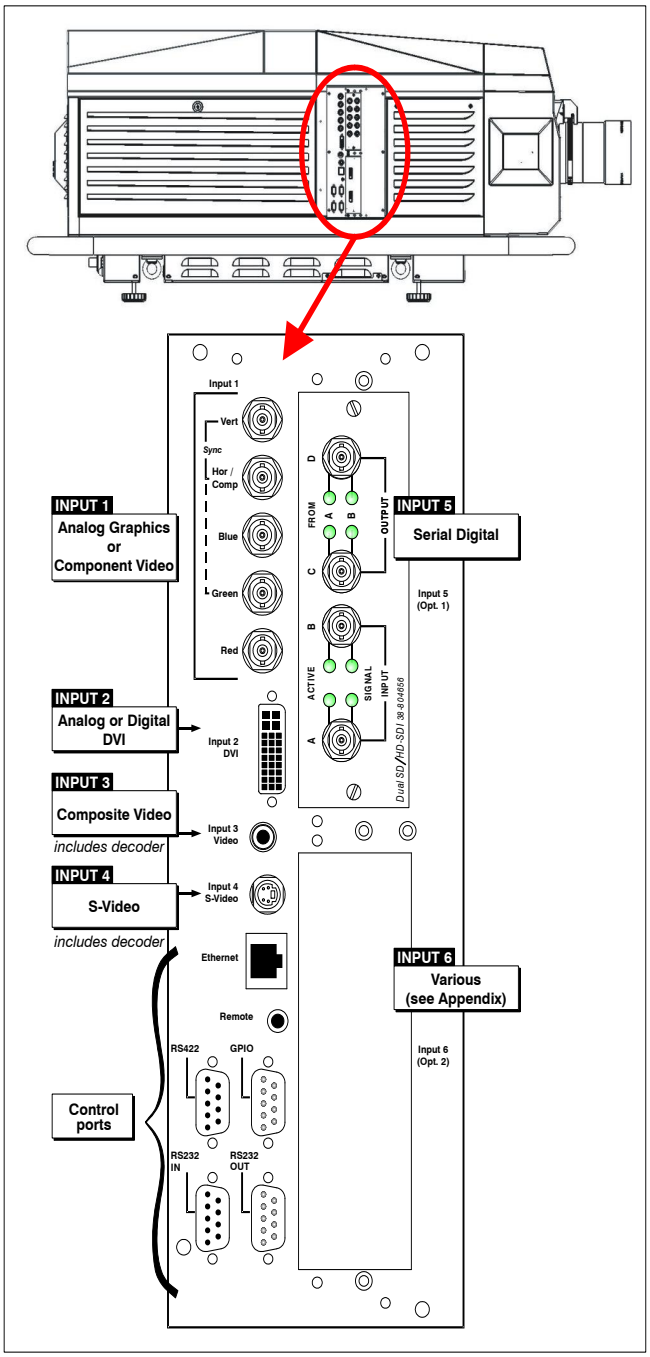


Figure 2-27 Roadie HD+35K Input Panel

NOTES: 1) *Refer to Section 6 Specifications for details regarding compatible inputs.* **2)** *Use high quality shielded cables only for all connections.*

2.5.1 RGB Signals

INPUT 1 consists of five BNCs (connectors) for linking to a variety of sources. The typical connection would be to an RGB source such as a PC, Mac, DEC, Sun, SGI and others. This projector supports multiple sync types with RGB signals: sync-on-green, composite sync, and separate H & V syncs.

NOTE: *Depending on your source, you may need a custom adapter cable with BNC connectors at the projector end and a different type of connector at the other (such as a 15-pin "D" connector for some computer sources). Contact your dealer for details.*

Connect the **SYNC** BNC input(s). Then connect the red, green and blue source outputs to the **RED**, **GREEN**, and **BLUE** BNCs on the **INPUT 1** panel. If the source uses sync-on-green, only the red, green, and blue connections are required. If the source provides a composite sync output, connect it to the **SYNC** input labeled **HOR/COMP**. If the source provides separate horizontal and vertical sync outputs, connect horizontal sync to the **SYNC** input labeled **HOR/COMP** and connect vertical sync to **SYNC** input labeled **VERT**. See *Figure 2-28*. Connecting an RGB Source.

NOTES: 1) *If for some reason the projector fails to recognize a signal as an RGB signal, specify this Color Space option within the Image Settings menu. Refer to Section 3.6.3 Image Settings Menu.* **2)** *To connect YPbPr signals-such as from DVDs or analog HDTV sources-to INPUT 1, use the red, green and blue BNCs as described in YPbPr Signals (below).* **3)** *This Input does not route to the decoder and cannot be used for Composite Video or S-Video.*

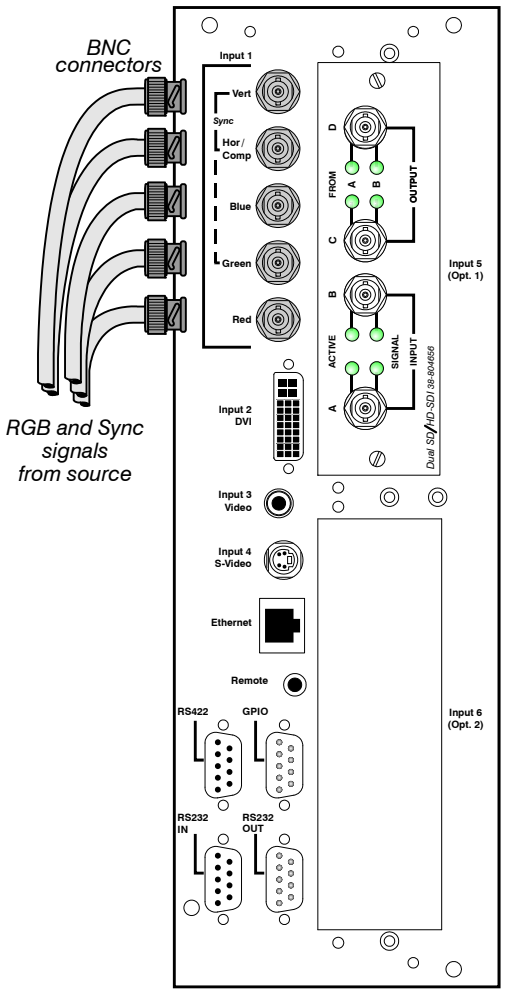


Figure 2-28 Connecting an RGB Source

2.5.2 YPbPr Signals (*Component Video*).

Connect a YPbPr signal (component video) to **INPUT 1** or **INPUT 2** as shown in *Figure 2-29*.

NOTES: *1) If, for some reason, the projector fails to recognize a YPbPr signal, specify this **Color Space** option within the Image Settings menu. Refer to Section 3.6.3 Image Settings Menu. 2) Do not connect digital component signals (known as YCbCr) to **INPUT 1** or **INPUT 2**. Use the appropriate optional digital interface installed in **INPUT 5** or **6** only.*

2.5.3 Composite Video

INPUT 3 and **INPUT 4** provide simultaneous connection of both a composite video source (**INPUT 3** and an S-Video source (**INPUT 4**). *Refer to Figure 2-30.*

NOTE: *Unlike previous Christie projectors, composite video and S-Video cannot connect to any other locations on the Input panel. Connect as shown in Figure 2-30.*

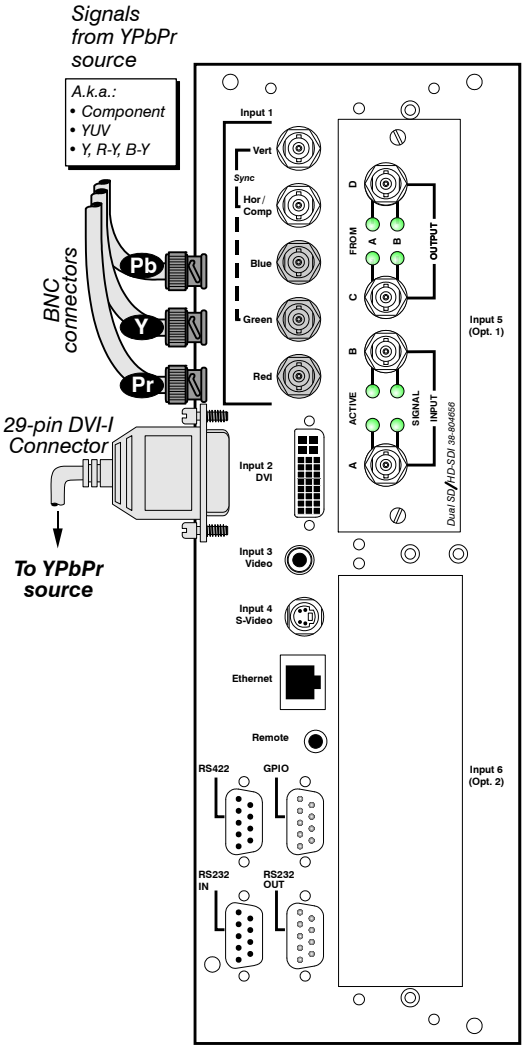


Figure 2-29 Connecting a YPbPr Source

2.5.4 Dual SD/HD-SDI

Christie's Dual SD/HD-SDI module is standard with this projector and factory-installed in the first option slot (labeled **INPUT 5**). Its loop-through capability enables incoming serial digital data (HD format) to be tiled across multiple screens, creating vast "mega resolution" displays. Alternatively, the multiple outputs can be overlapped for extra-bright displays, or simply distributed to additional projectors for multiple screens of the same image.

The module accepts one or two independent standard- or high-definition serial digital inputs, decodes them for processing in the main electronics of the projector, and outputs 10-bit RGB/YCbCr 4:2:2 video. Either input can be set as the active primary or secondary part of a Picture-in-Picture (PIP) display, and either input can be looped through to one (or both) of the module's BNC outputs.

NOTE: *Selection of these inputs is described in* *Section 3.2 Using the Built-In Keypad or Remotes*.

Connect a compatible SMPTE 292M or SMPTE 259M-C source(s) to one or both of the inputs located on the left side of the module. The module automatically detects the standard at each input and configure itself accordingly for correct termination of the signal. The module also detects and supports dual link 292M for SMPTE 372M video standards.

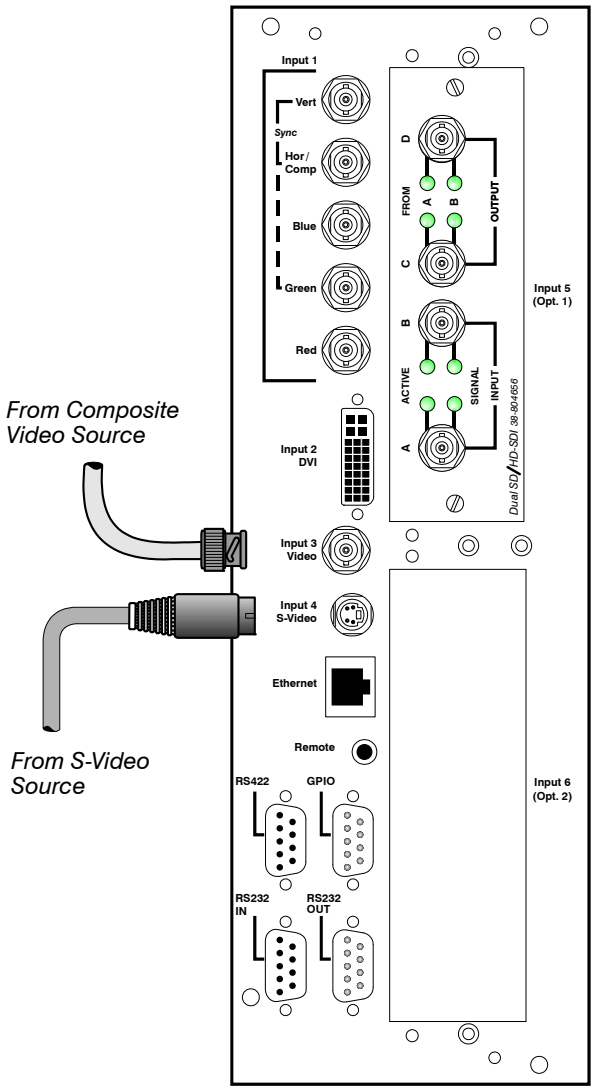


Figure 2-30 Connecting Composite Video and/or S-Video

2.5.5 Extra Video

If you want to use an extra video source in addition to the video source(s) connected at **INPUT 3** or **INPUT 4** connect either a Composite or S-video source to **INPUT 1** as shown.

NOTES: **1)** *Do not simultaneously connect Composite and S-video to **INPUT 1**.* **2)** *You can switch between video sources connected at **INPUT 1** and **INPUT 3** or **INPUT 4**.*

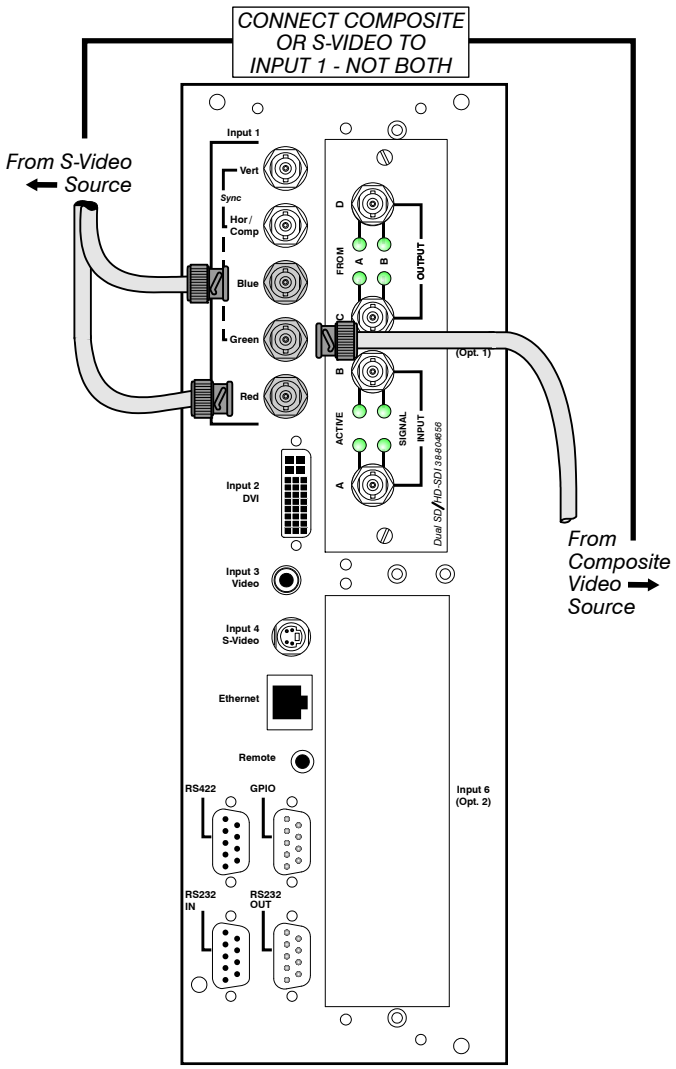


Figure 2-31 Connect Extra Video

2.5.6 Optional Inputs

Optional Input modules allow you to increase your total number of inputs and/or accommodate different signal types, whether analog or digital. Install in the areas labeled **INPUT 6** or (if available) **INPUT 5**. These interfaces include:

- DVI Input Module
- Dual SD/HD-SDI Module (supplied as standard in this projector)

For even more sources, connect a third-party switcher to the RS-232 IN port, or, if RS-422-compatible, to any of the two RS-422 ports.

Older Input cards not listed may be supported by the Roadie HD+35K.

NOTES: 1) *Connect analog HDTV signals directly to **INPUT 1** or to any other "RBG" Input module installed-the optional HDTV Input Module used in earlier projectors is not needed or recommended.* **2)** *See Section 2 Installation and Setup for a brief description of each interface.*

2.6 Connecting Communications

As an alternative to the projector's built-in keypad or standard IR remote, you may wish to communicate with the projector using a PC or other controller. Such a device sends commands and receives feedback via serial links (two types), Ethernet or GPIO communications, all described below.

2.6.1 Standard IR Remotes

As desired, direct the projector's standard IR remote towards the display screen or the projector's IR sensors. Alternatively, connect a wired version of the remote to either the three-pin XLR connector rear (standard) or the 3.5mm phono jack on the side of the projector, depending on which type of cable you are using with this remote.

NOTE: *Response to a wired remote must also be enabled in the Communications menu. Refer to Section 3.8 Adjusting System Parameters and Advanced Controls for more information.*

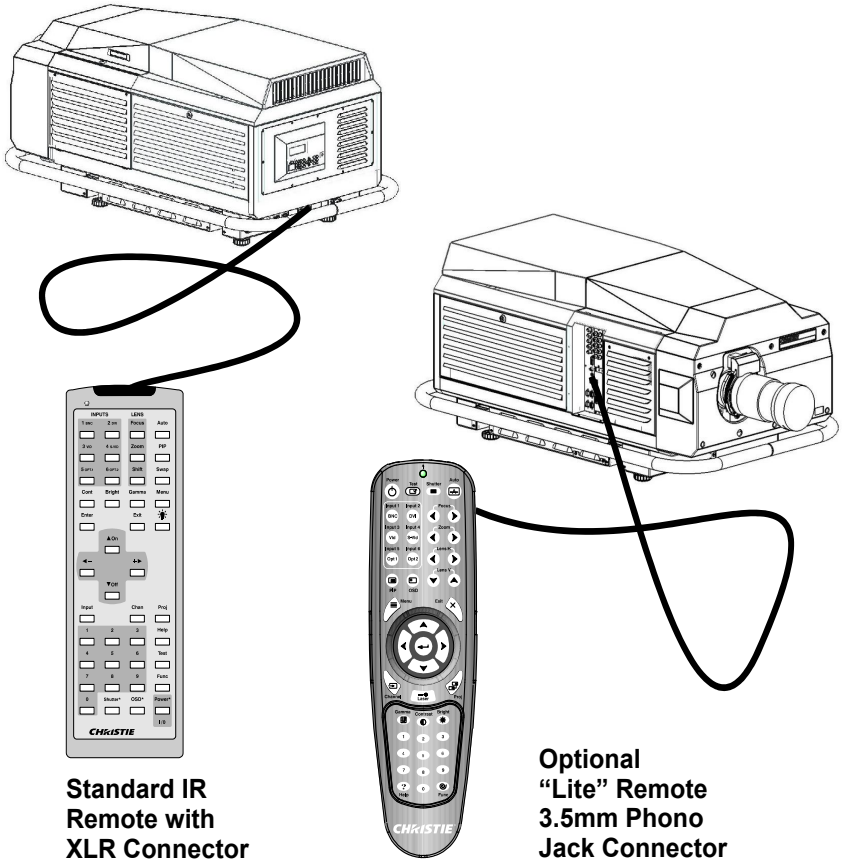


Figure 2-32 Remote Options

NOTE: *If both wired remotes are connected, communications via the side Input panel has priority over communications via the rear.*

2.6.2 Other Controllers

RS-232 Serial Communications

From most computers, connect a standard RS-232 serial communication cable between the computer, and the projector serial port labeled **RS232 IN**. This 9-pin connector is located on the side Input panel of the projector. Then set the projector's baud rate to match that of the computer.

Changing the baud rate is done in the projector's *Configuration > Communications* secondary menu. Refer to *Section 3.8 Adjusting System Parameters and Advanced Controls*.

RS-422 Serial Communications

Some computers can provide RS-422 serial communications (often through a plug-in adapter or external converter) rather than the more common RS-232 standard. RS-422 communication has differential "transmits-and-receives", and is generally better suited for long distances than is RS-232 communication.

NOTE: *RS-422 is not compatible with RS-232-connecting an RS-232-compatible PC to RS-422 can damage the equipment at either end. Consult the documentation provided with your PC if you are unsure.*

Changing the baud rate is done in the projector's *Configuration > Communications* secondary menu. Refer to *Section 3.8 Adjusting System Parameters and Advanced Controls*.

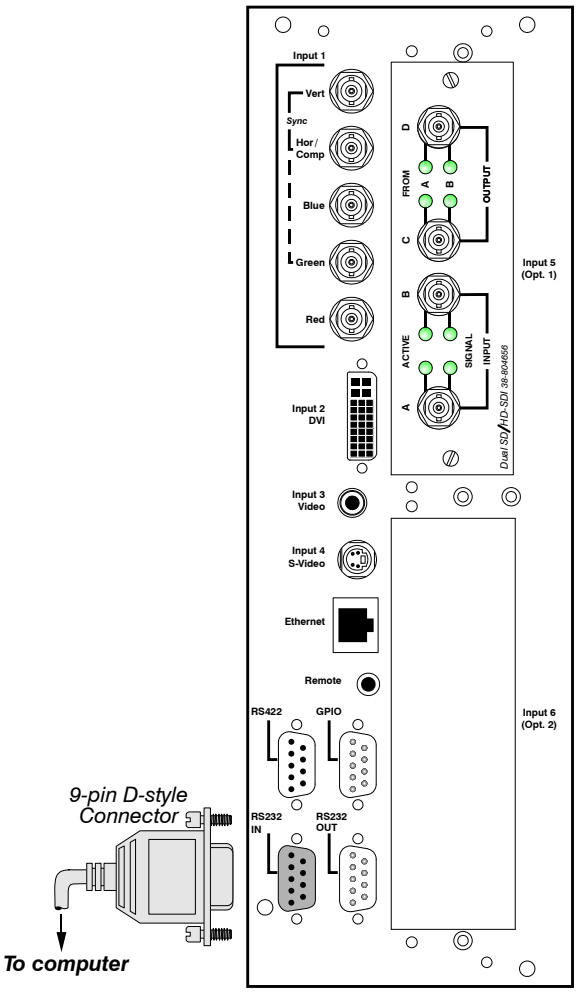


Figure 2-33 Connecting Serial Communications via RS-232

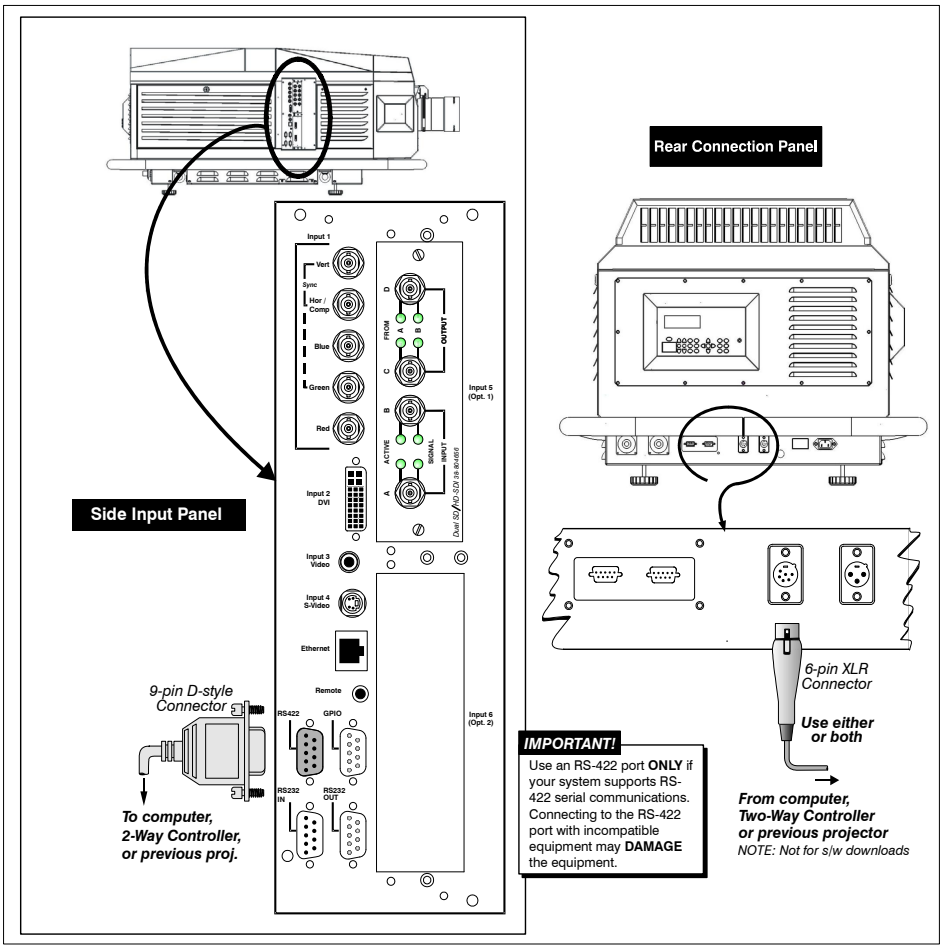


Figure 2-34 Connecting Serial Communications via RS-422

There are two RS-422 ports on the projector. One is a 6-pin XLR port (rear of projector) and the other is a 9-pin D-connector (side of projector). Use any of these ports for communications to and from an RS-422-compatible controller, and/or as in-and-out ports for networking multiple projectors together on a serial network (note there is no RS-422 "out" port).

NOTES: 1) *Do not use the rear ports for downloading main software upgrades to the projector-use the 9-pin side port only.* **2)** *Upon power-up of an RS-422 network, wait until all projectors are initialized before sending further commands. Commands sent during initializing will be lost.*

⚠ CAUTION ***Do not use an RS-422 port unless you are using equipment with RS-422 capability. The voltage levels of this signal can damage incompatible equipment.***

Ethernet Communications

To add the projector to an existing Ethernet network with other equipment such as controllers and other projectors, connect standard CAT5 Ethernet cable between your Ethernet controller (or hub) and the Ethernet port on the side of the projector.

NOTE: *An Ethernet crossover cable is required when connecting directly to a PC only.*

Upon connection to an Ethernet network, the projector's factory default IP address of 0.0.0.0 automatically enables the DHCP server function (if a DHCP server is available on the network). For example, the projector obtains a new IP address that is valid and unique for that network from the DHCP server. Or, if there is no DHCP server present (or if a specific static IP address for the projector is preferred or required), you can set the address in the *Ethernet Settings* menu or via an ASCII serial command.

NOTE: *Ensure that the projector is connected to the network before attempting to change its IP address.*

Regardless of how it is assigned, once a projector has a valid and unique address, it responds to commands sent to this address *after* the next power-up. To determine the projector's current IP address, consult the *Status* or *Communications* menus.

Connecting to an Ethernet Network

Refer to *Section 3.7 Adjusting System Parameters and Advanced Controls* for further information about setting up and using a projector connected via Ethernet.

The GPIO Port

The General Purpose In-Out (GPIO) port enables integration of the projector within an established control system so that other devices connected via the GPIO can operate in tandem with the projector, or vice versa. ASCII commands sent via standard serial ports can be stored in projector memory, where they can then trigger a sequence of events in response to incoming or outgoing signals at the GPIO port, depending on your programming of the GPIO pins. For example, you can automatically dim the room lighting when the projector is turned on, or automatically turn the projector off when the lights are raised.

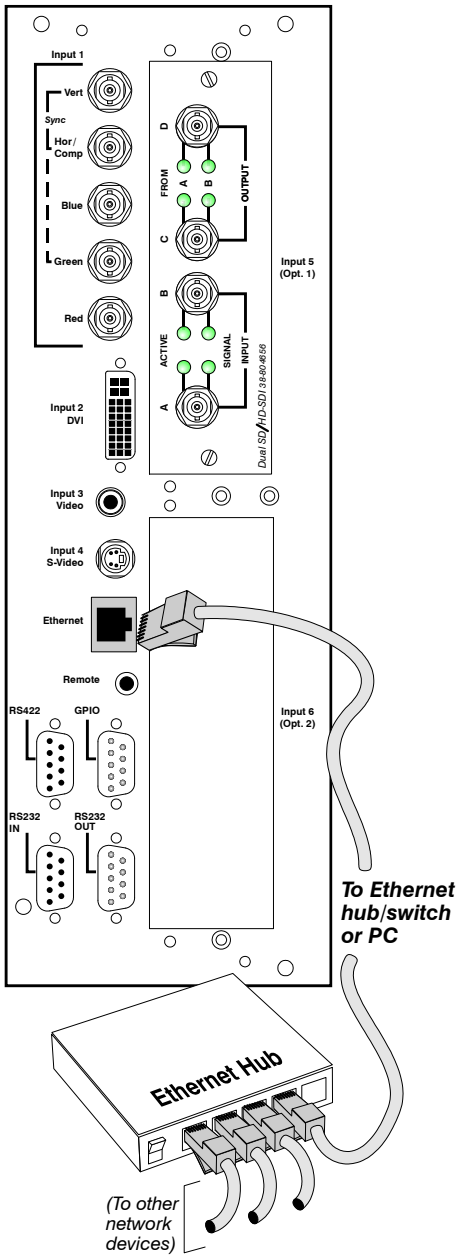


Figure 2-35 Connecting to an Ethernet Network

IMPORTANT! *Use a serial cable that is compatible with the external device.*

For more information, refer to *Appendix A: Serial Communication Cables*.

2.7 Connecting Multiple Projectors

You may wish to link two or more projectors together so that commands and communications to and from a controller are relayed between projectors. Choose a hardware configuration that best suits your desired communication method.

2.7.1 Serial Links

RS-232 Network

To control multiple projectors with a computer/controller having an RS-232 interface, first set all projectors to the same baud rate as the controller, then chain the projectors together by connecting the **RS232 OUT** connector of the first projector (already connected to the computer/controller) to the **RS232 IN** connector of the next projector in the chain. Continue connecting projectors in this manner until you've reached the last projector in the chain, so that only the last projector has an unused **RS232 OUT** port. See *Figure 2-36*.

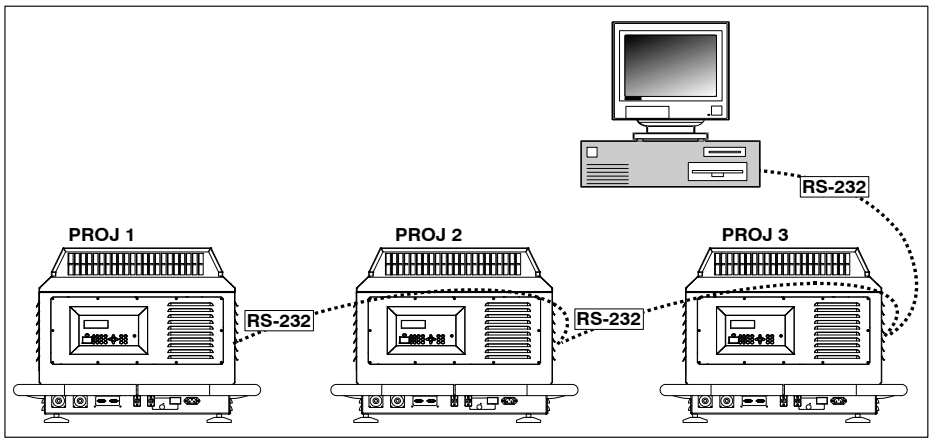


Figure 2-36 Typical RS-232 Network

RS-422 Network

To control multiple projectors with a computer/controller having an **RS-422** interface, first set them all to the same baud rate as the controller, then chain the projectors together by connecting an **RS-422** port of the first projector (already connected to the computer/controller) to an **RS-422** port on the next projector in the chain. Use any of the two **RS-422** ports available on the projector. One is located at the rear (6-pin XLRs) and one is on the side Input panel (9-pin D-connector). Continue connecting projectors in this manner until you've reached the last projector in the chain, and so that only the last projector has one unused **RS-422** port.

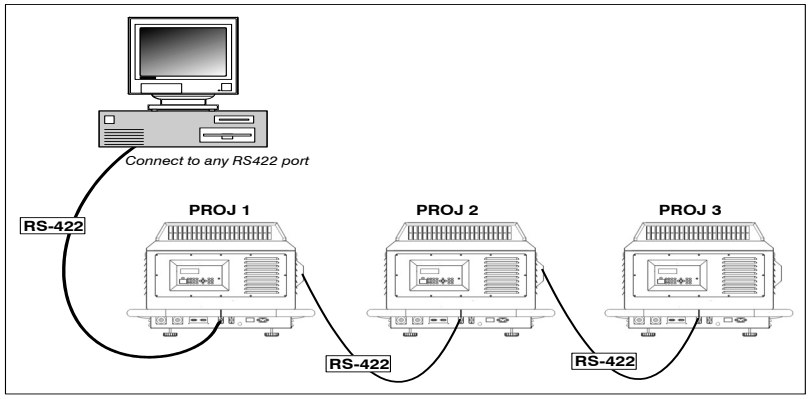


Figure 2-37 Typical RS-422 Network

NOTES: 1) *You can only connect up to a maximum of 32 projectors.* **2)** *Figure 2-37 depicts a typical input/output configuration, however, since RS-422 ports are bi-directional, other various combinations are possible.*

You can also connect by RS-232 or RS-422 (see *Figure 2-38*), in which case either type of serial communication must also reach the other type of port. You must enable this joining of network ports in the *Communications* menu by selecting the "*Network Routing*" option to "*RS232 and RS422 joined*" option. This enables all Serial messages to reach all serial ports.

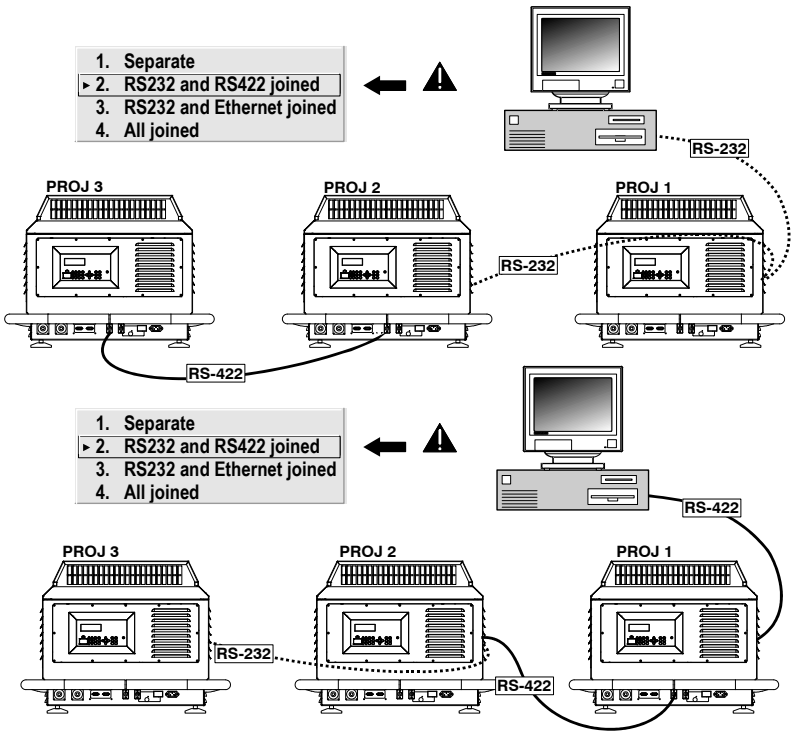


Figure 2-38 Examples of Joined RS-232 and RS-422 Networks

It should be noted that Communication parameters, such as baud rate, must be set to match the particular controlling device **before** connecting as a network. Refer to the documentation that came with your controlling device in order to determine the proper baud rate. Refer to *Section 3.8 Adjusting System Parameters and Advanced Controls* if you need help changing the projector baud rate.

NOTES: 1) *To avoid damage, connect only properly wired serial communication cables. Refer to Appendix A: Serial Communication Cables for details.* **2)** *It is recommended that each RS-232 communication cable be no more than 25 feet in length. Use high quality cables.*

2.7.2 Ethernet Networks

Ethernet Network Setup

To add one or more projectors to an Ethernet network, use standard CAT5 cable to connect each projector's Ethernet port to a hub belonging to the network. A controller or PC must also be connected to the hub. Refer to *Figure 2-39*.

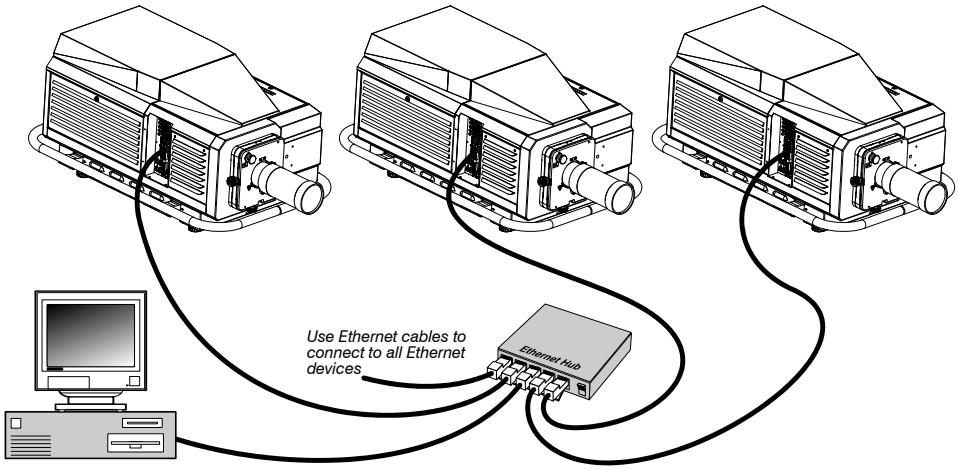


Figure 2-39 Typical Ethernet Network

Setting the Projector's IP Address

Upon connection to most Ethernet networks, each projector's factory default IP address of 0.0.0.0 triggers the network's DHCP (Dynamic Host Configuration Protocol) server to automatically assign an IP address that is valid and unique for use on that network. Depending on the network, this DHCP-assigned IP address usually remains stable for the current session, but may change with subsequent power-ups, and log ins. On some networks, the address even remains stable from session to session. In all cases, the projector's IP address and port appear in the *Status* menu, as well as, the *Ethernet Settings* secondary menu.

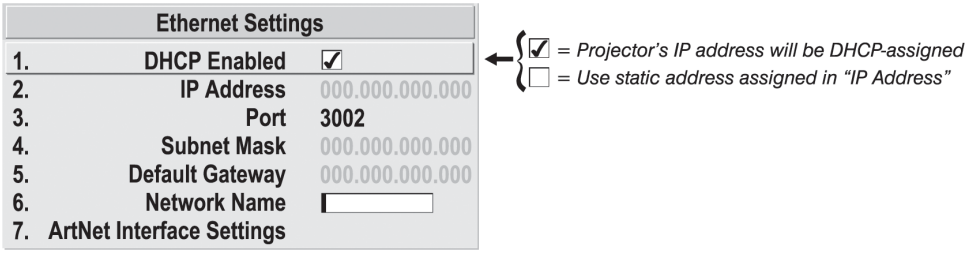


Figure 2-40 Setting the Projector's IP Address

It should be noted that if a networked projector's IP address is anything other than the default of 0.0.0.0 (shown as 000.000.000.000 in the *Ethernet Settings* menu), or if a DHCP server is not available, the automatic DHCP server function for supplying a valid and unique IP address is disabled. Instead, you must define a specific and static IP address by entering the new address in the *Ethernet Settings* secondary menu, or by sending one to the projector via a serial command. The projector then responds to commands sent to this address after the next power-up, after which the IP address remains in projector memory until you enter a new one, or until the DHCP check box is selected.

Changing the Port

On some Ethernet networks, firewall restrictions may require that the port number of the projector be changed from its default of 3002. If so, enter a new port number in the *Ethernet Settings* menu or include the new port# in an XIP serial command sent to the projector. It is highly recommended not to use a port# below 1024, as these ports are typically reserved by common IP applications.

Subnet Mask and Default Gateway

The Subnet Mask and Default Gateway are automatically assigned when DHCP is enabled. If a static IP is being used, it must be assigned before the subnet mask. The Default Gateway is an optional router device used to send and receive data outside the subnet.

ArtNet Interface Settings

Refer to *Section 3.8 Adjusting System Parameters and Advanced Controls* for additional information about ArtNet settings.

2.7.3 Separating or Joining Serial Networks

NOTES: 1) *A separate "redundant" network requires double serial links-RS-232 and RS-422-between all projectors.* **2)** *Set each projector's Broadcast Key to OFF.* **3)** *Remotes cannot broadcast when networks are separate-use controller(s) instead. 4) Do not use a split network when downloading new projector software.*

By default, communications originating from one type of serial controller-RS-232 vs. RS-422-stay on the corresponding network path rather than being broadcast to the other network. This separation is sometimes known as a split network and is indicated by the *Separate* setting for the "Network Routing" in the *Communications* menu, as shown in *Figure 2-41*.

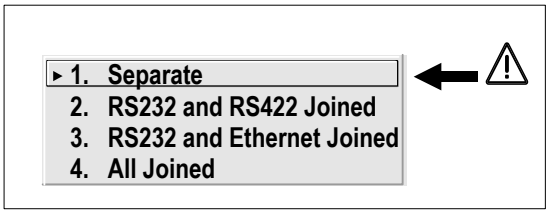


Figure 2-41 Keeping Networks Separate (default)

Keeping networks separate maximizes the efficiency of data transmission. In addition, separate paths means that one path can be considered a redundant "back-up", available if a failed projector (or controller) prevents communication via the first path. With a split network, each projector receives and sends either type of message depending on which controller initiates the commands-should one path fail, the second "back-up" network path can be used. Only one network should be active at a given time, as determined by the controller type (i.e. whether it is RS-232 or RS-422).

NOTE: *The "Broadcast Key" option must be OFF.*

Two Different Serial "Splits"

There are two different split serial network configurations possible (refer to *Figure 2-42*). Set up according to one of the following options as to which one best suits your application needs:

A. Split Network with One Controller. If you have a single controller and want a back-up serial link, connect one controller standard (e.g., RS-232) to one physical end of the network and the other controller standard (e.g., RS-422) at the other physical end of the network. Make sure the *Separate* option is selected for the "Network Routing" in the *Communications* menu.

If a projector should then fail anywhere in the network, communication with the remaining projectors can be resumed in the opposite direction using the other standard.

NOTE: *This configuration requires that both standards be available from a single controller, or that you use an RS-232/RS-422 adapter.*

B. Split Network with Two Controllers. If you have two controllers (one RS-232 and one RS-422) and want one to be a back-up, connect each controller to the appropriate port on the first projector in the network. Then connect projectors together using both RS-232 and RS-422 ports as shown. Make sure the *Separate* option is selected for the "Network Routing" in the *Communications* menu. Now, if either controller fails, you can simply switch to the other controller and communicate via the other standard.

For either configuration below, make sure to segregate the networks from one another by selecting the "*Separate*" option for "Network Routing" in the *Communications* menu. Refer to *Figure 2-41*.

NOTE: *When connecting RS-422 to a projector, use either the identical rear ports (6-pin XLR) or the 9-pin "RS422 IN" port on the side Input panel.*

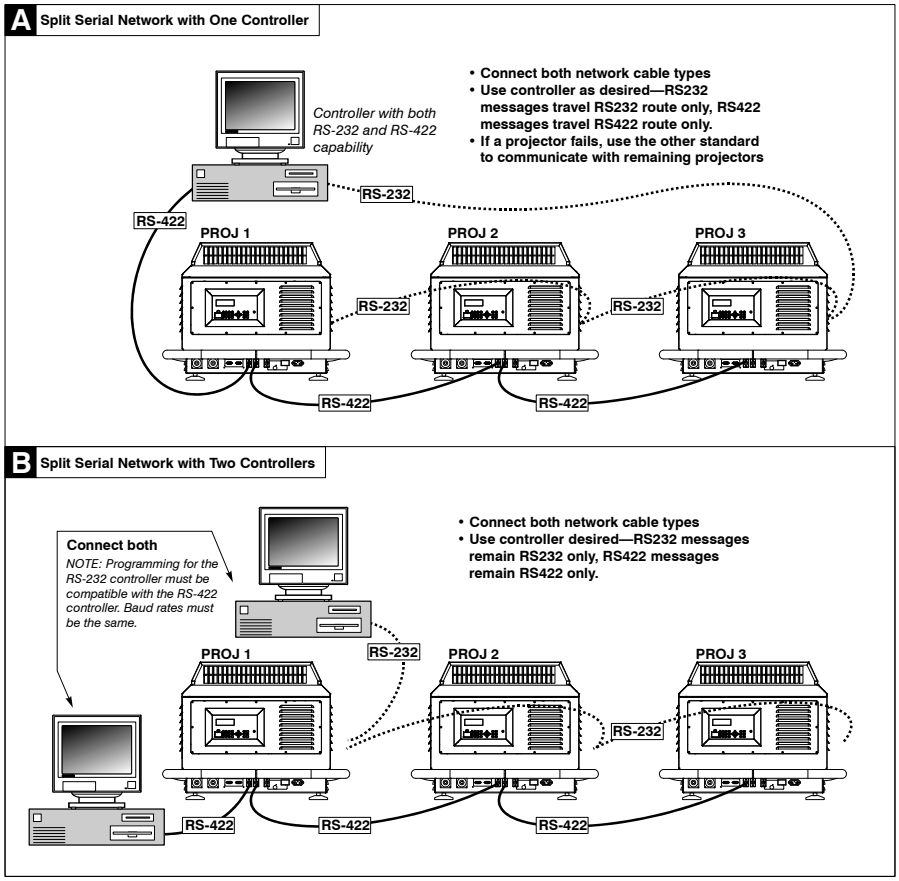


Figure 2-42 Sample Hardware Setups for Split Networks

IMPORTANT! ***Whenever downloading new projector software to networks, use a single-route RS-232 network only. DISCONNECT any redundant serial cabling and select "Separate" for "Network Routing" in each projector.***

2.7.4 Communicating to All Ports

To relay messages to all ports (RS-232, RS-422, and Ethernet) regardless of the original source, set the "Network Routing" option in the *Communications* menu to "All Joined" for each projector. This configuration is useful if you have one type of controller available, but must link projectors via the other type. For example, you may need to use both an RS-422-compatible controller and an Ethernet-connected PC for working with a network of projectors linked via their RS-232 in/out ports.

In this case, select the *All Joined* option for "Network Routing" in the *Communications* menu so that all messages reach all ports throughout the network.

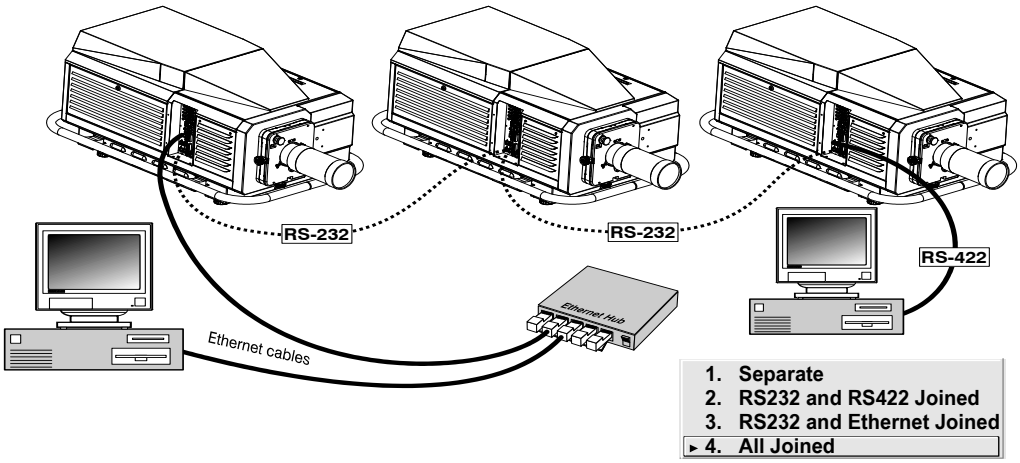


Figure 2-43 Joining All Networks

2.7.5 Communicating to Certain Ports

If desired, you can isolate your RS-422 communications so that they are not relayed to any other network by selecting the **RS232 and Ethernet Joined** option for "Network Routing" in the *Communications* menu. Messages from the Ethernet will reach the RS-232 network, and vice versa, but RS-422 messages will not.

To isolate your Ethernet from the serial networks, select the **RS232 and Ethernet Joined** option so that all serial messages will be relayed to all serial ports, but Ethernet communications will not (and vice versa).

To keep each network communication links separate from each other, select the **Separate** option.

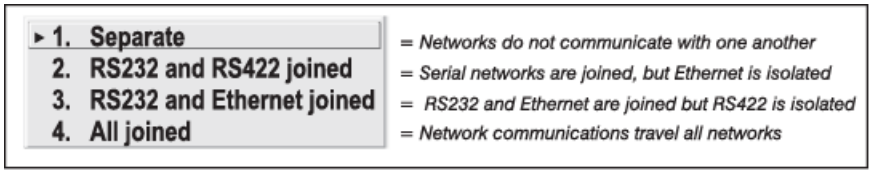


Figure 2-44 Port Communication Menu

2.7.6 Projector Numbers

It is helpful to define a unique 3-digit projector number to each projector connected in a serial network (for instance, 001, 002, 003, etc.). These numbers enable you to direct commands to a single projector rather than always broadcasting to the entire network. For complete information on how to assign and use projector numbers on a serial network, refer to *Section 3.8 Adjusting System Parameters and Advanced Controls*.

2.8 Connecting the Ballast

Do not connect the ballast to AC unless the projection head and ballast are already connected to each other.

⚠ WARNING ***Connect the ballast to the projector FIRST, and then connect to AC.***

2.8.1 Configuring the Ballast for Incoming AC

AC power levels vary from region to region throughout the world, with 400 VAC common in some countries (such as those in Europe and Asia), and 200 VAC common elsewhere (such as in North America and Japan). To accommodate both possibilities, this ballast includes an internal *Input Power Range Switch* for toggling to the level of AC available at the installation site, i.e. either 200 or 400 VAC. The line cord plug must also match.

From the factory, the ballast's switch and line cord are both set for 200 VAC use. Used/rented ballasts shipped from other installation sites may be set to either, depending on where they were last used-check the status of the line cord plug and switch before attempting to connect to AC. Refer to instructions shown in *Figure 2-45*.

⚠ WARNING ***A Christie accredited service technician required.***

1. A visual inspection of the plug indicates the status for the 200 or 400 VAC. Modify as necessary for your site, as a delta load with safety ground, the plug has no neutral.
2. Remove the ballast cover to access and read the Input Power Range Switch.
3. Toggle the switch ***left*** for use with 200 VAC supplies, or toggle ***right*** for 400 VAC supplies.
4. Attach the ground lug to Earth Ground.
5. Re-install the ballast cover.

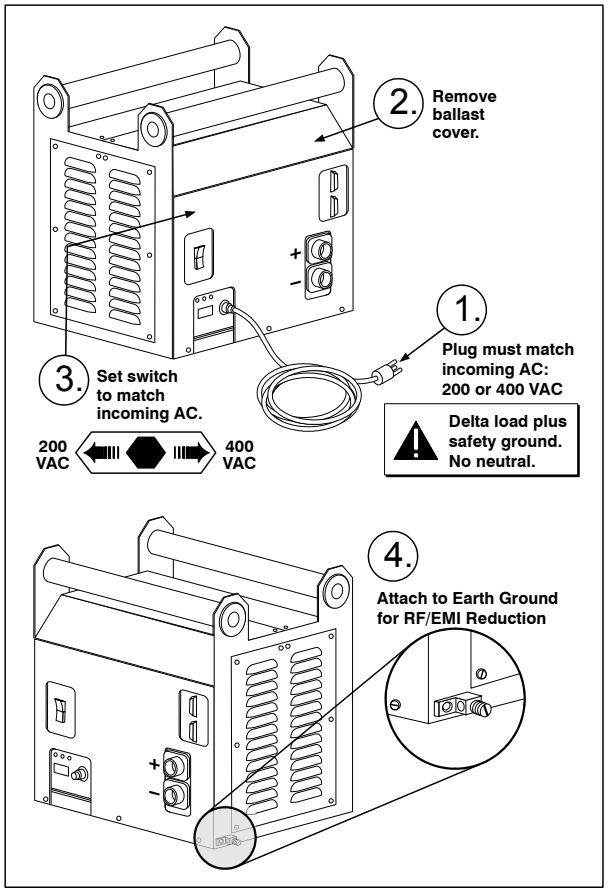


Figure 2-45 Setting up the Ballast

2.8.2 Connect to Projector

Connect all four ballast cables. There are two DC power cables, and two communication/control cables to the rear of the projector and to the lamp ballast. Refer to *Figure 2-2*.

2.9 Initial Switch On

When the ballast has been properly configured (refer to *Section 2.8 Connecting the Ballast*) and connected to the projection head, connect its integral line cord to AC.

2.9.1 Set Lamp Type

Before switching the projector on, set which size lamp is installed. This ensures that proper power is provided to the lamp upon ignition, preventing the risk of seriously overdriving a lamp.

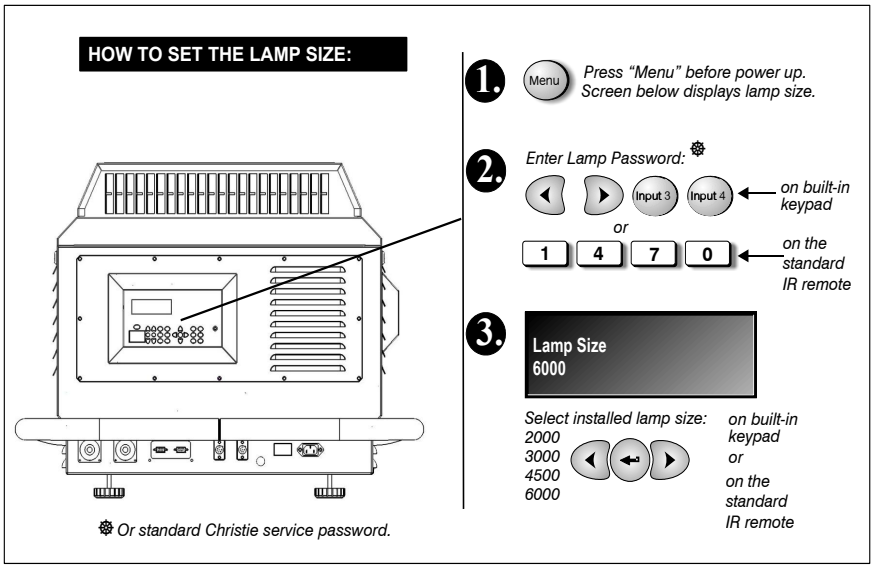


Figure 2-46 Checking or Setting Lamp Size

⚠WARNING ***Explosion hazard! Keep the projector OFF until you have defined which lamp type is installed.***

1. Press MENU. The Status Display at the rear of the projector displays a "Lamp Size" of 2000, 3000, 4500 or 6000 watts, depending on its last setting (factory default=6000).
2. Enter the Lamp password. See *Figure 2-46*.

NOTE: *Unless the "Enable Password" service option has been turned off, you must enter a password.*

3. Click POWER and use the UP ARROW to locate and select which lamp is currently installed.
4. When the Status Display shows the correct lamp type, the projector and lamp can be switched on. Make sure the lamp type is also indicated on the lamp door label. If not, record with a sticker or dry erase marker.

2.9.2 Turning ON the Projector

After the breaker/power switch (located on the ballast) has been switched ON, follow the procedure described for the *Roadie HD+35K* system in *Section 3.3 Power-up Procedure/Checklist*, Steps 1 and 2.

2.9.3 Set Cable Length

In the *Lamp* menu, set the "Cable Length (m)" slidebar to match the length of the high-voltage DC cables connected between your lamp ballast and projection head. This regulates the voltage drop that occurs over distance, and ensures that adequate voltage reaches the lamp. Particularly in projectors rented for temporary installations, this setting may have to be changed from its last use. Adjustment range is 2-30m (6½-100 ft.).

2.10 Maximizing Light Output

NOTE: *By default from the manufacturer, this projector is optimized for brightness rather than wider color gamut or higher contrast ratio-i.e., neither a small-diameter contrast ratio aperture nor the yellow notch filter is installed in the projector. These are options.*

Upon powering up the projector with a newly-installed/replaced lamp, adjust lamp position to help ensure optimized operation as well as peak brightness at the screen-you do not need an image displayed yet. Once you have done this **LampLOC** adjustment, the lamp will be well-centered and distanced correctly from the remainder of the illumination system. It can be re-adjusted as needed at any time.

For best results in most applications, use the *Do Auto* button. The motorized lamp adjustments begin and, in conjunction with an internal light sensor, take a minute or two to position the lamp for optimized brightness. If desired, you can operate the motors individually and use the "Intensity" reading at the top of the menu for feedback.

NOTE: *Lamp must be ON and shutter open during LampLOC™ adjustment, however the projector does not need to be displaying an image.*

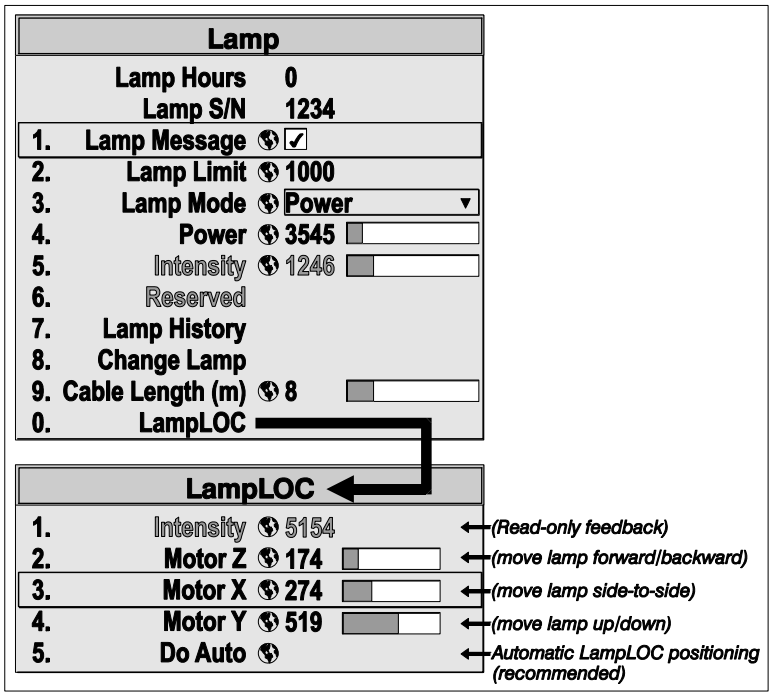


Figure 2-47 Align the Lamp

2.11 Basic Image Adjustment

NOTE: *Assumes a single projector is powered up in its final location.*

This initial optical alignment procedure is the foundation for optimizing your displays, ensuring that images reflected from the DMDs are parallel to and well-centered with both the lens and screen. It should be completed before adjusting the lens boresight.

Before you begin:

Properly position the projector relative to the screen (refer back to *Section 2.3 Projector Position and Mounting*).

Basic Optical Alignment Procedure

1. Display a test pattern appropriate for analyzing image focus and geometry, such as a single crosshair centered across the image.
2. **Course focus**. Do a quick preliminary focus and (if available) zoom adjustment with the primary lens only. *Refer to Section 3.14 Working with the Lenses*. Do not worry about consistency across the image at this point, just center focus.
3. **Center the image in the lens**. Holding a piece of paper at the lens surface, adjust offsets as necessary until the image on the paper is centered within the lens perimeter. A full white field works best for this.
4. **Re-check side-to-side levelling**. With a test pattern on screen, double-check projector leveling (*refer to Section 2.3 Projector Position and Mounting*) so that the top edge of the image is parallel to the **top edge** of the screen.

2.12 Boresight Adjustment

NOTES: 1) *Projector must be installed and powered up in its final location. Install the anamorphic lens if it will be used at the site.* **2)** *You will need a 3/16" Allen wrench.* **3)** *Boresight may need slight adjustment after installing a new lens.*

To ensure proper offset for your site and consistently good focus in all areas of the screen, a primary lens must be installed and its lens mount precisely adjusted in relation to internal optics as described below. If desired, an anamorphic lens can then be added to widen images for "scope" displays. Once adjusted, boresight should remain stable until the lens is replaced.

Refer to lens mount components illustrated in *Figure 2-48* for these adjustments.

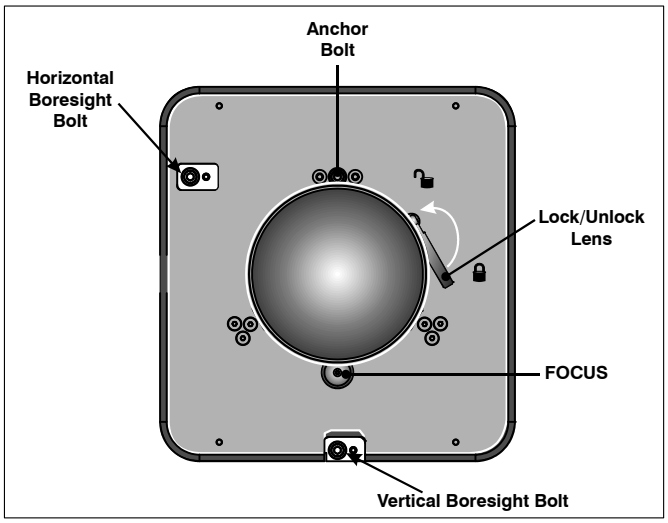


Figure 2-48 Adjusting the Lens Mount

2.12.1 Adjust Offset

NOTE: *Project an image using the primary lens only. The optional anamorphic lens, if present, can be mounted, but swung aside.*

Prior to boresight adjustment, offset the image as required so that the image is square on screen, but offset is minimal. For best results, try to minimize offsets by "aiming" the projector lens at the center of the image. Refer back to *Section 2.3 Projector Position and Mounting* for offset ranges and method of adjustment.

2.12.2 Adjust Left/Right Boresight

1. Adjust focus at the far left center edge of the image. If possible, reduce image size for easier image analysis.
2. If the image appears well-focused on the left edge, but not on the right, then the boresight currently differs from one side to the other. For example, the right side of the image is well-focused either in front of or behind the screen surface rather than on it.

   To determine where the right-side is focusing:

   - Hold a piece of white paper approximately parallel to the screen surface at the right side (and as close to the vertical center as possible), then move closer to the projector while watching the image on the paper.
     - If focus on the paper improves, this indicates that the right side of the image is focusing in front of the screen.
     - If focus on the paper worsens, this indicates that the right side of the image is focusing behind the screen.

GOAL: If the image comes into focus on both sides simultaneously, left/right boresight is fine. Skip to Step 6.

3. Adjust the horizontal boresight bolt (*Figure 2-49*) as necessary to direct or "aim" the lens toward the side of the image which focused too close to the lens. When both sides appear equally blurry, re-focus on the left side of the screen.
4. Adjust horizontal offset to re-center the image on the screen.
5. Repeat Steps 3 and 4 until both sides of the image are well focused.
6. Adjust the "hold" screw to lock in place, and check boresight again.

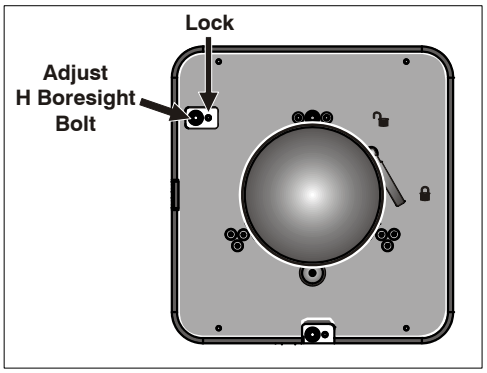


Figure 2-49 Adjusting Left/Right

2.12.3 Adjust Top/Bottom Boresight

1. When the left/right boresighting is complete, focus the image at the top edge of the screen.
2. If the bottom remains blurry while the top edge is focused, refer back to *Section 2.12.2 Adjust Left/Right Boresight*, Step 2. However, use a paper at the bottom of the screen to determine whether the bottom of the image is focused in front of the screen or behind the screen. If the bottom is well focused, skip to Step 6.

3. Adjust the vertical boresight bolt (*Figure 2-50*) using one allen key to hold the bottom hex screw and another to turn the adjustment bolt above it. Adjust as necessary to direct or "aim" the lens toward the edge of the image which focused too close to the lens. When both top and bottom appear equally blurry, re-focus at the top of the screen.
4. Adjust vertical offset to re-center the image on the screen.
5. Repeat steps 8 and 9 until the top and bottom of screen are both well focused.
6. **Refocus**. Although all sides of the image should now be in focus, the center of the image will be slightly blurry at this point. Refocus at center of image. The goal is good focus at center and on all sides.
7. Adjust the "lock" screw to lock in place, and check boresight again.

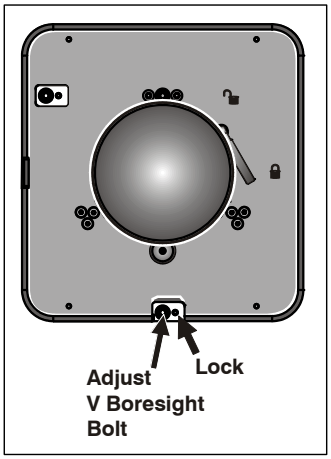


Figure 2-50 Adjusting Top/Bottom Boresight

2.12.4 Add Anamorphic Lens

If present, swing the anamorphic lens in position in front of the primary lens. It should magnify in the horizontal direction only, stretching the image straight across the screen-this requires that its aperture (visible within the lens) be vertically aligned with the screen. If the image appears skewed, loosen the locking ring on the anamorphic lens and rotate the lens as necessary until the wide image is horizontal.

1. **Focus primary lens**. With the anamorphic lens in place, re-focus the primary lens. The goal is good focus at center and on all sides.
2. **Focus anamorphic lens**. If horizontal focus in the image needs improvement, focus the anamorphic lens too-rotate its barrel, as needed.

For more information, refer to *Section 3.14 Working with the Lenses*.

2.13 Internal Optical Adjustments

In rare instances, shipping and handling may affect the precise factory alignments of one or more optical components-as a final step during installation, a trained installer may want to adjust the fold mirror and/or convergence of the DMDs as described here. In addition, for certain applications and sites you may prefer images having increased contrast ratio and/or the widest possible color gamut, both of which require the addition of internal optical components (sold separately) that will slightly reduce brightness.

NOTE: *A Christie accredited service technician is required.*

2.13.1 Contrast Ratio Adjustment

To achieve **increased Contrast Ratio**, and if desired, the standard *F# Aperture* installed at the factory can be replaced with an optional smaller aperture that improves contrast ratio while slightly limiting brightness.

NOTES: 1) *Some lamps may be incompatible with some apertures, and it is therefore advised that you use only the size(s) recommended for the lamp currently installed in the projector. Follow the installation instructions provided with the F# Aperture Kit.* **2)***The size of any smaller aperture is clearly labeled along its top edge. The factory-installed standard-size aperture (for maximum brightness) is not labeled.*

2.13.2 Color Gamut Adjustment

For the widest color gamut, install the *Yellow Notch Filter* (optional) inside the projector, near the lens opening. Adjust to match a known standard, such as x=0.265, y=0.690, or as desired. In applications where maximum brightness is preferred over increased color gamut, do not add the *Yellow Notch Filter* (this is the factory default).

2.13.3 Maximizing Brightness

Do not use either the optional *Yellow Notch Filter* or a small-diameter high-contrast F# Aperture option in the projector to achieve **maximum brightness**. This is the factory-default configuration. Also, make sure a standard high-brightness lens is used.

2.13.4 DMD Convergence

A convergence problem is evident when one or more projected colors (red/green/blue) appears misaligned when examined with a proper convergence test pattern. Normally the 3 colors should overlap precisely to form pure white lines throughout the image and one or more poorly converged individual colors may appear adjacent to some or all of the lines. A Christie accredited service technician can correct as described on the color *Convergence Instructions* label provided inside the projection head.

NOTE: *Custom Convergence Kit required (available separately).*

2.13.5 Fold Mirror Adjustment

If a corner or edge of an image is missing, this may indicate that the fold mirror has become misaligned with the rest of the optical system and cannot reflect all data properly.
Correct as described below:

1. Locate the fold mirror access plate secured to the underside of the projection head, just below the lens. It has 2 access holes along the front edge, through which you can carefully adjust the fold mirror screws
   - To raise or lower the image, adjust the screw closest to the left side (exhaust side of projector).
   - To move the image left or right, adjust the screw closest to the right side (lamp side).

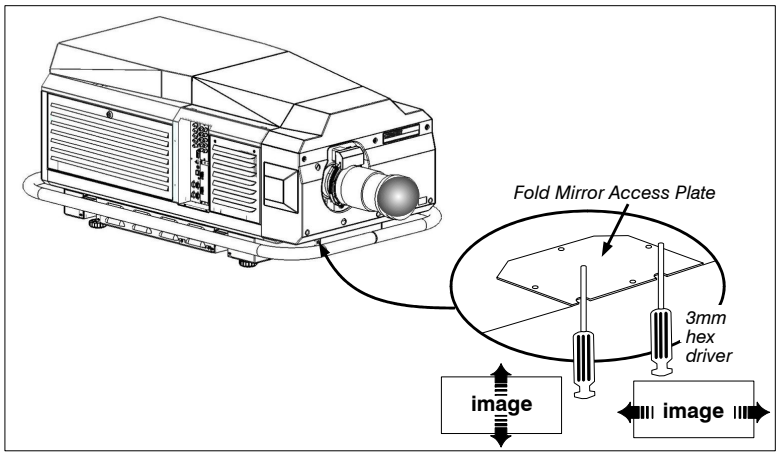


Figure 2-51 Fold Mirror Adjustment

Proper fold mirror adjustment is shown in *Figure 2-51*, with the whole image well-centered between the projected edges of the integrator.

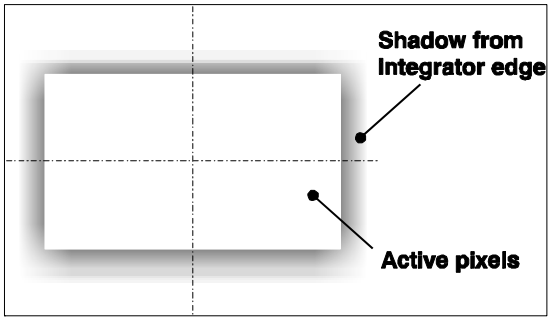


Figure 2-52 Proper Fold Mirror Adjustment

2.14 IR Remote Protocols and Adjustment

At manufacture, every remote is assigned "A" as its default protocol, which is simply a collection of settings that determine how the remote operates. Once assigned, this protocol remains in effect until you change its protocol. The standard IR remote can operate using one of 7 different protocols, or it can be set to a "wired" protocol when a cable is added for connecting the remote to the projector. Changing a remote's protocol is done via "hard-wired" jumper settings inside the remote.

The IR remote protocols A-G are generally used for multiple-projector applications. For example, you might want to change a remote's protocol if you need to control multiple projectors independently (see *Figure 2-53*). When Remote A operates under a different protocol than Remote B (or others), each remote communicates only with the projector(s) having a matching protocol defined in memory.

NOTE: *Matching the protocol on the projector to that of a remote is done through a setting in the Communications secondary menu. Refer to Section 3.8 Adjusting System Parameters and Advanced Controls for further information on how to define which protocol the projector's infrared sensors (rear and front) will recognize.*

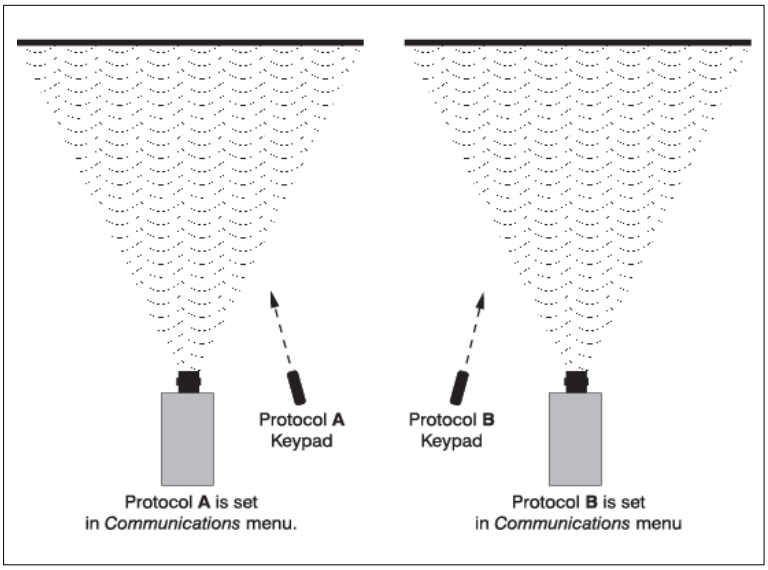


Figure 2-53 Independent Remotes and Projectors

2.14.1 Standard IR Remote Protocols

The *Roadie HD+35K's* standard IR remote can be set to 1 of 7 different protocols (A through G).

To change protocol in the remote, follow Steps 1 through 4:

1. Unlatch and open the battery compartment on the back of the remote as shown in *Figure 2-54*.

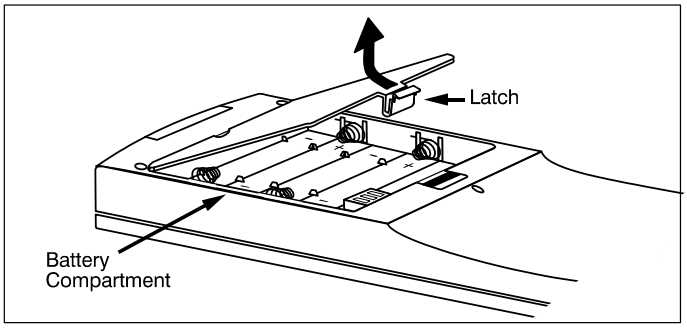


Figure 2-54 Opening the Remote

2. Find the 4 jumpers located along the latching side of the battery compartment. These jumper settings establish the remote's protocol so that the remote functions in a certain manner.
3. Set the jumpers to match one of the protocols shown in *Figure 2-55*. Use tweezers or needle-nose pliers to remove and replace each jumper as necessary.
   - *J1* jumper - Set between 1 and 2 or 2 and 3 as required for the desired protocol.
   - *J2* jumper - Set between 1 and 2 or 2 and 3 as required for the desired protocol.
   - *J3* jumper - Set between 1 and 2 or 2 and 3 as required for the desired protocol.
   - *J4* jumper - For IR use, always set between pins 1 and 2 (see A-G below).

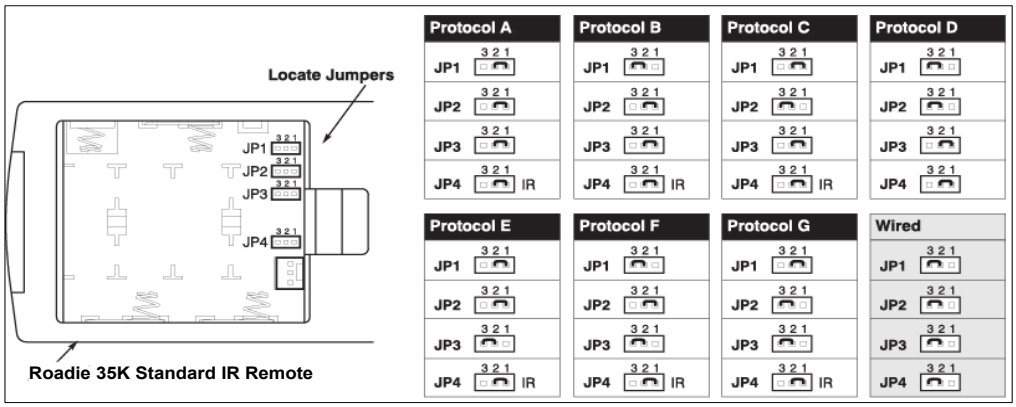


Figure 2-55 Locating and Setting the Jumpers

4. Replace the battery compartment cover. To test, plug wired IR remote into the projector.

NOTE: *If you change any remote to a new protocol and the projector stops responding, the projector may be set to a conflicting protocol. Use the projector's built-in keypad to access the Communications secondary menu. Under "Front IR" or "Back IR", select the protocol that matches the new protocol of the remote at hand. The projector should now respond properly.*

Shortcut Method

Unlike earlier Christie projectors and remotes, there is no shortcut method for changing a remote's protocol through a special sequence of keystrokes. You must change the internal jumper settings.

2.14.2 Converting a Remote

If desired, you can convert an IR remote into a wired remote and vice versa. Set the jumpers as shown in *Figure 2-55*, and add or delete the cable and batteries as required. The cable with appropriate connector is supplied with the projection head.

To Change from Infrared to Wired:

1. Remove battery compartment cover from back of remote.
2. Remove batteries.
3. Wait 1-2 minutes.
4. Plug the remote cable (supplied) into the empty battery compartment. Pack with foam as an internal strain relief. Make sure that the battery cover is notched smoothly to accommodate the cable without pinching it.
5. Set the remote's protocol to "wired" jumper setting (refer back to *Figure 2-55*). Make sure to set jumper #4 between pins 2 and 3 as shown in the last example (shaded).
6. Replace battery compartment cover.
7. Plug into the 3-pin XLR port at the rear panel of the projector.

To Change from Wired to Infrared:

1. Unplug the remote's cable from the projector.
2. Open the remote back and unplug the remote cable.
3. Wait 1-2 minutes.
4. Install batteries. *Refer to Section 2.14.1 Standard IR Remote Protocols*.
5. Set jumpers according to the desired IR protocol (refer back to *Figure 2-55*). Make sure to set jumper #4 between pins 1 and 2, as shown for all remote protocols.
6. Replace battery compartment cover.

3 Operation

This section describes how to use the controls and switches for basic projector operation once it is properly installed, aligned and configured by a Christie accredited service technician, as described in *Section 2 Installation and Setup*.

⚠ WARNING **Refer to Safety Warning and Guidlines in *Section 4 Maintenance*.**

3.1 Projector Basics

Primary Roadie HD+35K components are identified below:

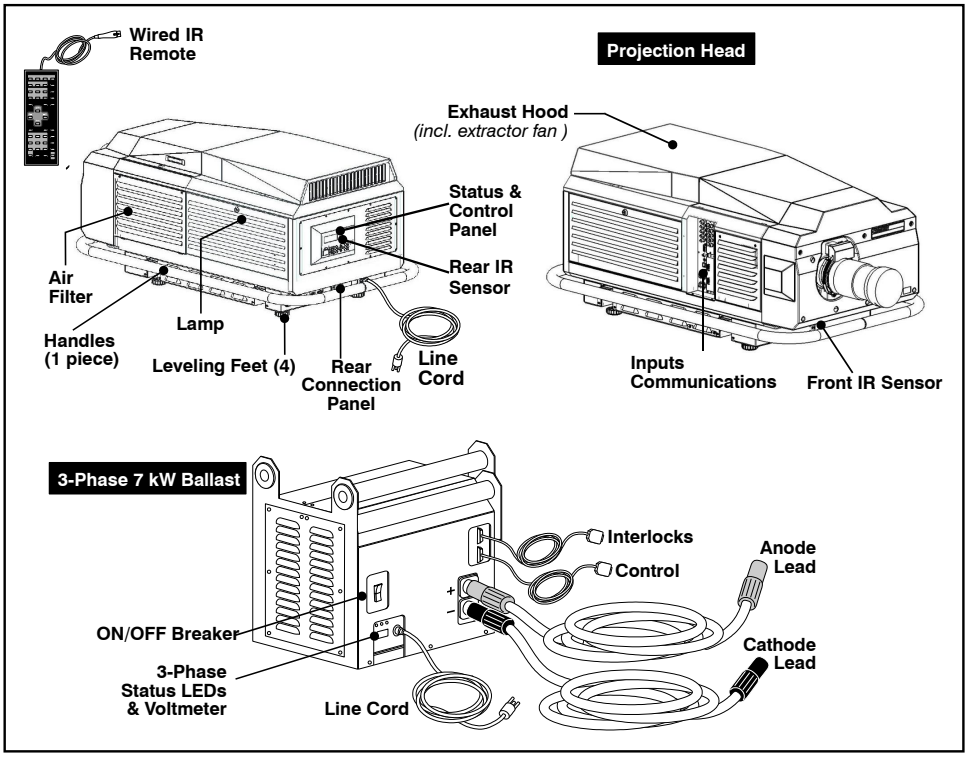


Figure 3-1 Basic Roadie HD+35K Projector and Related Components

Projector components are briefly described and listed in alphabetical order in the following section.

3.1.1 Air Filter

Intake air flows through the filter before circulating in the front compartment to cool the main electronics. Replace the air filter whenever the lamp is replaced-or sooner in dusty/dirty environments. Refer to *Section 4.4 Replacing the Lamp & Filter* for complete instructions.

IMPORTANT! *Check condition monthly.*

3.1.2 Ballast Breaker/Power Switch (ON/OFF)

The breaker/power switch located on the lamp ballast serves two purposes:

1) It is a power switch for the Roadie HD+35K ballast.

2) It protects against over-current conditions of 50A or more.

The breaker/power switch must be in the ON position to enable normal Roadie HD+35K system power-up and operation. If faulty or major excessive AC is detected, the breaker/power switch "trips" to OFF in order to prevent damage. Try switching the breaker/power switch ON again. If the breaker/power switch continues to trip OFF, this indicates a major fault, and the AC problem must be resolved. Possible causes might include shorts, damage to lamp cables, or very excessive AC.

NOTE: *You must press* POWER *on the built-in keypad as the breaker/power switch does not power up the projector or start the lamp.*

The ballast's internal fan is the only indication whether or not the breaker/power switch is ON. Lights on the ballast indicate only that the ballast is plugged in.

3.1.3 Control Panel (Rear of Projector)

The rear control panel includes the built-in keypad, IR sensor, 2-digit status/error code display window, and the LCD status display, as described in *Table 3.1*.

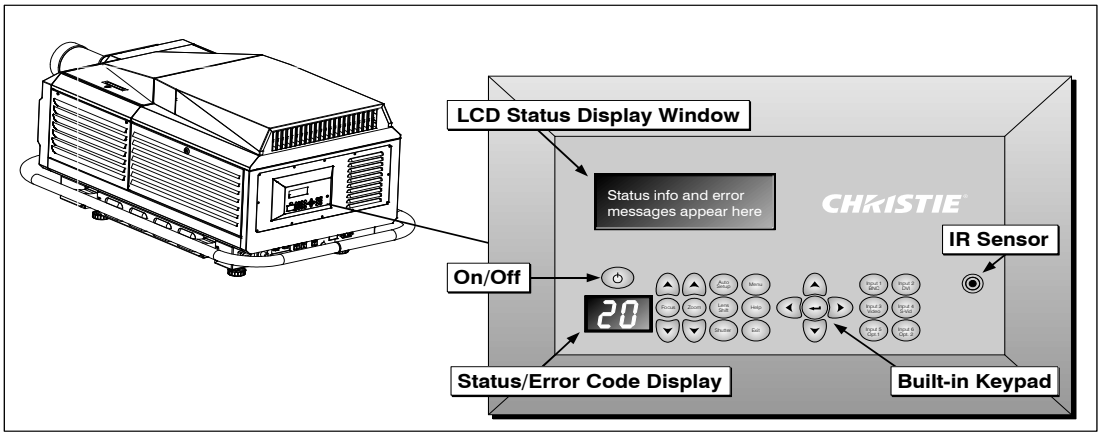


Figure 3-2 Rear Control Panel

Table 3.1 Rear Projector Control Panel

Control Panel Area	Description
Built-In Keypad	Provides access to all software controls needed for working with the projector. For more convenient functionality, you can use a remote, web browser, or a serial message-based method of control.
IR Sensor	Sensors at the front and rear of the projector detect commands from the standard IR remote.
Two-Digit Status/Error Code Window	The code that displays in this window indicates the basic operational state of the projector. Each code references its corresponding status/error message and displays it in the *LCD Status Display* window. Refer to *3.15.1 System Warnings/Errors* for the list of all possible codes and corresponding messages.
LCD Status Display	Full status and error messages appear in this window.

3.1.4 Handles

Mounted to the bottom of the projector is the handles assembly, which allows for transportation of the projector over a short distance. The handles can also be used to hoist a single projector only. Any overhead suspension used must be suitably rated for the weight of the projector. For rigging purposes, the weight of the projector will not exceed 435 lbs. (197.3 kg.) including the handles.

Installations which require the stacking of projectors must use the FredFrame™. In this case, the handles assembly must first be removed to expose the projector's channels and allow for installation of the FredFrame™.

3.1.5 Channels for FredFrame™

An adjustment mechanism (part of Christie's FredFrame™) that is inserted and secured into the channels located under the projector, enabling the projector to be hoisted, flown, and/or stacked. Consult complete installation instructions supplied with the FredFrame™ Kit.

3.1.6 Lens Mount & Anamorphic Lens Mount

The lens mount secures and seals a primary zoom lens within the projector, and provides adjustment of focus, zoom and offset via the projector's built-in keypad or standard IR remote. An optional anamorphic lens mount may be added adjacent to the primary mount. This provides a mechanism for positioning a 1.26x anamorphic lens in front of the primary lens. This type of lens horizontally spreads a pre-squeezed image back into its wider 2.39:1 "scope" image, and is most typically used in side-masking displays.

3.1.7 Lens Mount and Projection Lenses

The projector is built with a motorized lens mount that allows for easy lens control and adjustment. This includes such functions as adjusting vertical and horizontal offsets, zoom and focus. The lens mount can be fitted with any one of the available optional lenses. Refer to *Section 6.2 Lenses*.

Zoom and Focus

There are two motors that allow for quick motorized adjustment of zoom and focus. Adjust zoom to fit the displayed image on the screen and adjust focus to improve the clarity of the image.

Lens Offset

Vertical and horitontal offset is performed on the lens mount through the use of stepper motors.

NOTES: 1) *The projection lens is shipped separately from the projector.* **2)** *Use the lens caps when transporting the lens to avoid scratching and damaging the lens, which could affect your displayed image.*

3.1.8 Input Panel

Located along the side of the projector, you can connect input sources and a variety of communication cables here, all described in *2.5 Connecting Sources* and *2.6 Connecting Communications*. If desired, connect an optional remote which has a small headphone jack type connector.

3.1.9 Lamp

Use one of the following lamp sizes (3-Phase ballast requirements):

- 2.0 kW
- 3.0 kW
- 4.5 kW
- 6.0 kW

Keep the lamp door closed and locked for all normal operation. Only trained Christie accredited service technicians can access the lamp via a security key. Complete lamp details are provided in *Section 6 Specifications*.

3.1.10 Leveling Feet

Turn the four adjustable feet to increase or decrease projector height and/or tilt as needed. For most installations, the projector is most likely to be slightly inclined to match screen tilt - this reduces the amount of vertical offset required. Refer to *Section 2.3 Projector Position and Mounting*. For flown projectors, the feet can be removed.

3.1.11 DC Power Cables

Heavy-duty DC lamp cables between the ballast and the projection head are 6½ - 100 feet (2-30 meters) in length. The ballast and projection head include their own North American line cords.

3.1.12 Projection Head

The projection head houses all critical illumination and optical components as well as the DLP processing technology responsible for combining light and incoming source signals into brilliant high-resolution digital displays. Source inputs connect to the input panel on the side of the projector. Projector function is controlled via the built-in keypad, standard IR remote, or another communication link from a controller. The projection head is closed and locked for normal operation.

3.1.13 Rear Connection Panel

The rear connection panel links the projection head to AC power, to an external RS-422 controller, and to the other Roadie HD+35K components (ballast, and a wired remote), as described in *Table 3.2*.

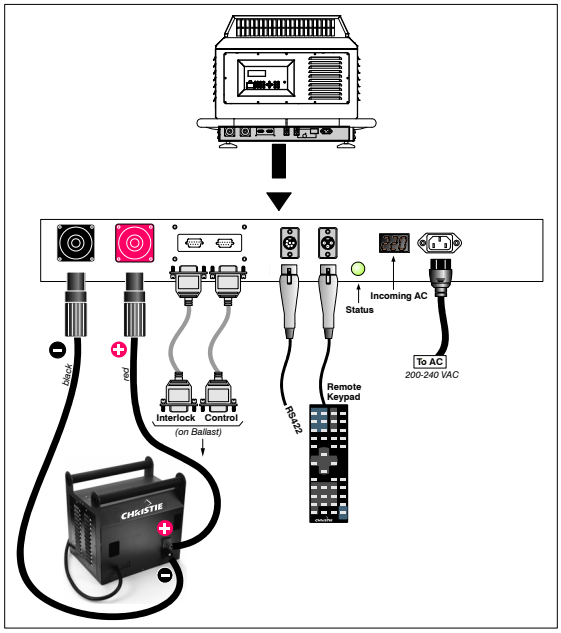


Figure 3-3 Rear Connection Panel Layout

Table 3.2 Rear Connection Panel Layout

Rear Connection Panel Area	Description
CATHODE/ANODE Connectors	For connecting the ballast's 2 lamp cables (both DC). Note that cable length must also be defined in the projector.
BALLAST INTERLOCKS	For connecting the safety interlock signals and the Lamp Enable signal between the ballast and the projection head (RS-232).
BALLAST CONTROL	For connecting the RS-232 control signals between the ballast and the projection head, enabling the projection head to dictate the amount of current (or power) to be supplied from the ballast to the projection head.
RS422	Use this port to connect RS-422-compatible equipment, such as a PC, for serial communication. The port also provides loop-through connection of a serial network. Refer to *Section 2.7 Connecting Multiple Projectors* for details. Unlike the 9-pin RS422 port on the side of the projector, the rear RS422 port cannot be used for downloading new software to the projector.
REMOTE	For connecting the wired remote.
VOLTMETER	During operation, this window displays the number of AC volts reaching the projector. Monitor and make sure the display reads within the acceptable nominal AC range (200-240) at all times. If the window is dark, this indicates that 1) the projection head is unplugged or 2) the projection head is not powered up or 3) inadequate, excessive or faulty AC has automatically "tripped" (opened) the breaker/power switch to OFF, causing a shut-down.

Table 3.2 Rear Connection Panel Layout

Rear Connection Panel Area	Description
PROJ. STATUS	This large bright light indicates from a long distance the current operating state of the projector, such as, if it is turned OFF, running normally, or it has a critical problem that needs investigation. OFF = Projection head is unplugged Yellow = Head is plugged in, but turned off Green = Normal operation Red = Error preventing normal operation
AC INPUT	For connecting the projection head line cord to AC. Upon plug-in, the projector is in a minimal power stand-by mode.

3.1.14 Security Locks

Critical internal components and/or connections are protected by standard medium-security locks. This safeguard helps ensure access by authorized personnel only. Remaining panels are not removable with standard tools, or they are blocked by other obstacles that prevent theft or tampering.

3.2 Using the Built-In Keypad or Remotes

The projector is typically controlled using one of the following:

- **The built-in keypad** (*Figure 3-4*) located at the rear of the projection head
- **The standard IR remote** (*Figure 3-5*) for wired (includes a 100 ft. cable) or wireless control up to 100 feet away

While the built-in keypad or standard remote provides complete control of the projector, they differ slightly in their arrangement of keys and in what functions can be accessed directly with a key press, rather than requiring use of the Menu system. You may find the built-in keypad or the standard IR remote more convenient than another for your specific installation and application.

3.2.1 Built-in Keypad

To control the projector when signals from a standard IR remote cannot reach the projector, you can use the projector's built-in keypad, located at the rear of the projector. Two nearby windows provide feedback indicating current status and activities of the projector. Because the built-in keypad has fewer keys than the standard IR remote, certain projector functions are accessible only through the *Menu* system.

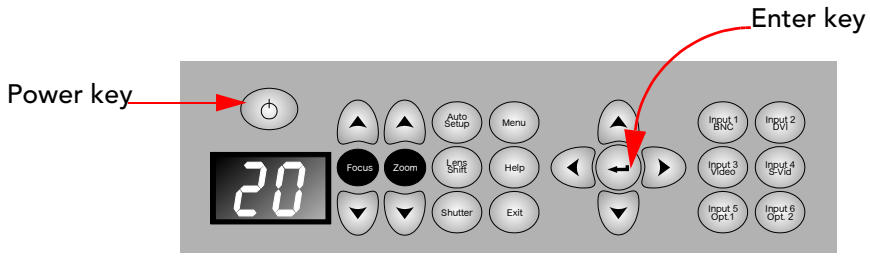


Figure 3-4 Built-in Keypad at Rear of Projector

3.2.2 Standard IR Remote and Transmission

The Roadie HD+35K comes with a standard IR remote which controls the projector by way of wireless communication from a battery-powered infrared (IR) transmitter. Use the standard IR remote the same way you would use any remote supplied with a TV or DVD player. When pressing any key, ensure that you direct the remote either toward the screen or toward the front or rear of the projector. One of the two IR sensors on the projector detects the signals and relays the commands for internal processing.

Refer to the key descriptions provided for the standard IR remote (*Figure 3-5*).

3.2.3 Wired IR Remote

Should you require a wired connection, use the cable (100 ft. cable supplied) to connect to the 3-pin XLR jack connector (*Figure 3-3*) located at the rear of the projector. You also need to set the proper internal jumper settings accordingly. The wired standard IR remote is recommended when:

- The rear built-in keypad is inaccessible
- The lighting conditions are unsuitable for proper IR transmission

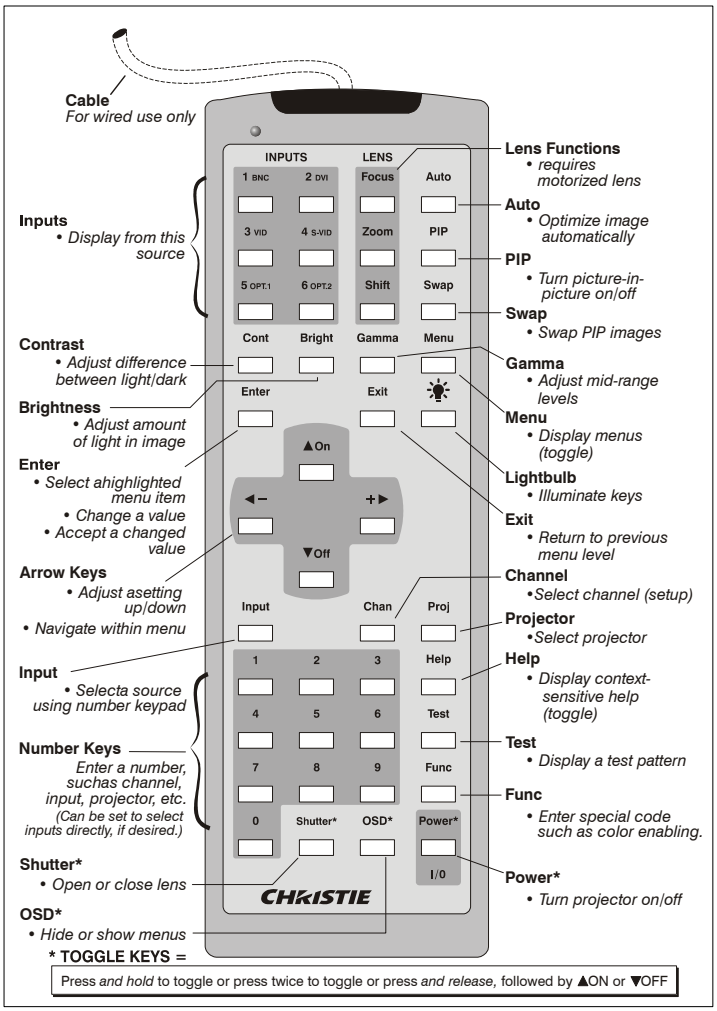


Figure 3-5 Standard IR Remote Keypad

3.2.4 The Lite Remote (Optional)

A smaller "lite" remote with a laser pointer is also available as an option. It has a single IR protocol, and therefore it needs no change in jumper settings, and connects via a 1/8” 3-pin phono jack connector to the input panel on the side of the projector. Commands from this remote have priority if the standard IR remote is also connected (to the rear of the projector). Refer to *3.2.3 Wired IR Remote*.

NOTE: *Both remotes will work at the same time.*

To change the jumper settings to "Wired", refer to *Section 2.14 IR Remote Protocols and Adjustment*. Upon plug-in to the projector, make sure that you check the "Wired Keypad" check box in the *Communications* menu to enable this function.

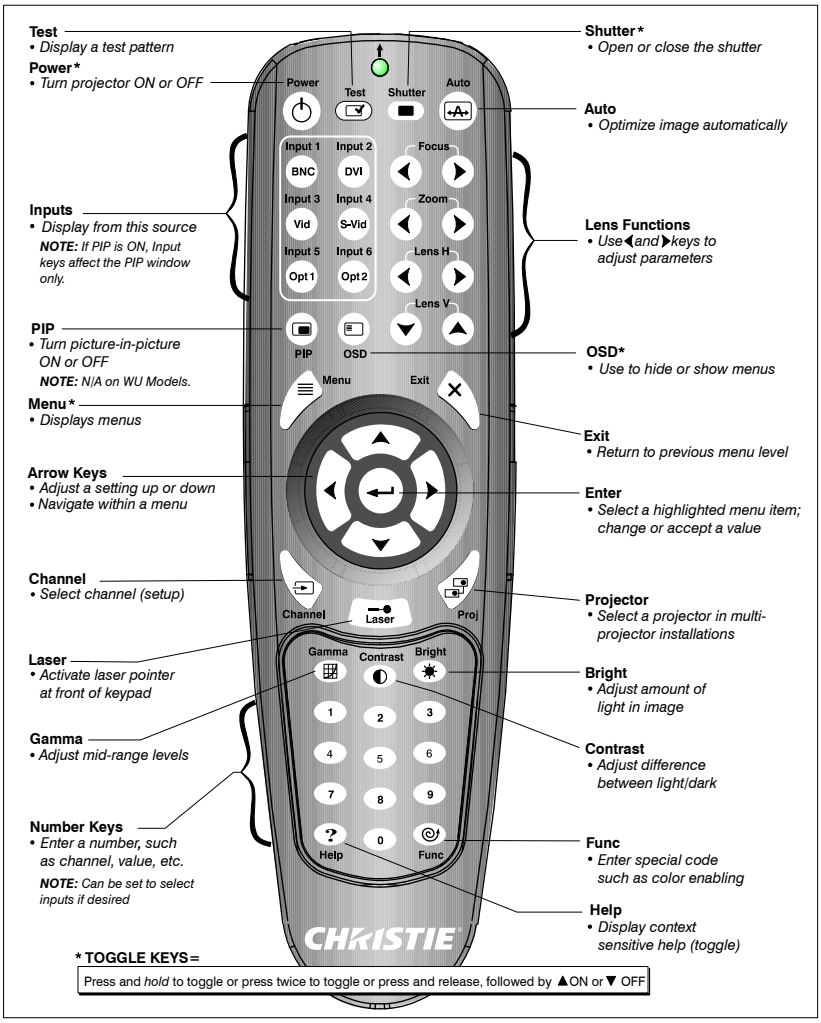


Figure 3-6 The “Lite” Remote

Laser functionality

Specific to the "lite" remote, you can use the Laser pointer by pressing the LASER key. This feature is useful when making presentation by pointing the remote at the screen to highlight an area of your presentation. The closer you are to the screen, the brighter the laser beam appears. The laser pointer works best in an environment where the ambient lighting can be controlled.

3.2.5 Guide to Keypads

Keep in mind the following guidelines:

- Press keys one-at-a-time; there are no simultaneous key combinations available.
- To protect against accidental use, there are three keys (Power, Shutter, and OSD) which are "press-and-hold" keys that do not function with a typical quick press-and-release keypress.
- Press and hold the ARROW keys down for continuous adjustment/movement in the desired direction. In serial networks, pause briefly between adjustments to ensure that more distant projectors can "keep up" with the commands.
- If you press a key while the projector is still responding to the previous action, such as during power-up, the second key press may not take effect.

3.2.6 Keypad and Standard IR Remote Functions

Specific keys related to the built-in keypad and standard IR remote perform various functions as explained below.

Power (ON/OFF) Key

Using either the built-in keypad or standard IR remote, do one of the following to switch the projector ON or OFF, and ignite the lamp:

- press and hold the POWER key for at least two seconds
- press the POWER key and then press the UP or DOWN Arrow keys on either the built-in keypad and standard IR remote (useful if you are unsure of the present state of the projector)
- press the POWER key twice quickly to toggle from the projector's present ON/OFF state

The main PROJ. STATUS light at the rear of the projector should now be green on the projector to indicate that the projector is up-and-running. For best results, let the projector warm up for about 5 minutes.

NOTES: 1) *After powering down, the lamp cooling fan remains ON for approximately 10 minutes to cool the lamp.*
2) *It is a good idea to avoid turning a projector back ON until it has been OFF for at least 2-3 minutes. Hot re-strikes of the lamp may reduce lamp life.*

Test Function Key

Press the TEST key on the standard IR remote to scroll through the projector's internal test patterns, in order, including the current input. To scroll through the test patterns (no input) only, use the LEFT/RIGHT Arrow keys to move in either direction.

Auto (Setup) Function Key

Press the AUTO key on the standard IR remote or AUTO SETUP on built-in keypad to initiate an automated process which allows the projector to optimize critical display parameters, such as size, position, pixel tracking, etc., for the current Input source. These parameters are listed in *Table 3.3*. The ***Auto Setup*** function can save time in perfecting a display, and allow you to make adjustments as desired.

Table 3.3 Auto Setup

What an "Auto Setup" Does	
OPTIMIZES:	**SETS TO DEFAULT:**
Pixel Tracking	*Contrast*
Pixel Phase	*Brightness*

Table 3.3 Auto Setup

What an "Auto Setup" Does	
OPTIMIZES:	**SETS TO DEFAULT:**
Size and Blanking	*Auto Input Level (off)*
Vertical Stretch	*Detail (if video source)*
Position	*Filter*
Input Levels	*Luma Delay*

NOTE: *You must have an unlocked channel present to use* AUTO SETUP.

Help Function Key

Press the HELP key (either the built-in keypad and standard IR remote) to display summary information about the current menu or highlighted menu option. Or, if there is no menu present, press HELP to access a list of general Help topics. To exit any Help text display, press the HELP key again or press EXIT.

Channel Selection Key

Press the CHAN key to select a specific source setup (channel) already defined and stored in the projector's memory. Once you enter a 2-digit channel number (or, if there is a list available, highlight the ***Channel*** option, and press ENTER), the display automatically changes and updates according to the numerous setup parameters defined for the selected channel. Understand that a new channel is automatically created if you adjust an image from a new source.

NOTE: *The* CHAN *key behavior during a presentation depends on whether or not the* ***Display Channel List*** *option is enabled in the Menu Preferences menu. You can choose to use a scrollable list of channels when you press the* CHAN *key, or you may prefer to enter the desired Channel number "blind", i.e., without on-screen feedback.* Refer to *Menu Preferences later in this section.*

Input 1 Key (BNC)

Press the INPUT 1 key to display from the data input source connected to BNCs labeled **INPUT 1**. If PIP is enabled, press **INPUT 1** to assign it as the PIP source. This option is not available with some models.

Input 2 Key (DVI)

Press the INPUT 2 key to display from the DVI source (analog or digital) connected to **INPUT 2**. If PIP is enabled, press **INPUT 2** to assign it as the PIP source.

Input 3 Key (VID)

Press the INPUT 3 key to display from the composite video source connected to **INPUT 3**. If PIP is enabled, press **INPUT 3** to assign it as the PIP source. This option is not available with some models.

Input 4 Key (S-VID)

Press the INPUT 4 key to display from the S-video source connected to **INPUT 4**. If PIP is enabled, press **INPUT 4** to assign it as the PIP source. This option is not available with some models.

Input 5 Key (OPT.1)

Press the INPUT 5 key to display from the **INPUT 5** interface module installed in the *Option 1* slot, which typically is the standard factory-installed *Dual SD/HD-SDI Module*. If PIP is enabled, press **INPUT 5** to assign it as the PIP source. Note, if there are two inputs connected to this module, the second input (B) is considered to be INPUT 7 and can be most easily accessed with **INPUT 7**. Or, if you are using the built-in keypad or the optional "lite" remote, neither of which have a separate INPUT key, use **INPUT 5** to access **INPUT 7** as follows:

- While displaying from **INPUT 5**, press the INPUT 5 key again. This switches to **INPUT 7**.
- While displaying from any input *other* than the *Dual SD/HD-SDI Module,* press the INPUT 5 key. This switches to either **INPUT 5** or **INPUT 7**, depending on which of the Dual SD/HD-SDI Module inputs (A or B) was last used. Press the INPUT 5 key again to display from the other *Dual SD/HD-SDI Module* input.

Input 6 Key (OPT.2)

Press the INPUT 6 key to display from the **INPUT 6** interface module installed in the *Option 2* slot. If PIP is enabled, press **INPUT 6** to assign it as the PIP source. If the *Dual SD/HD-SDI Module* is installed here, and there are two inputs connected, its second input (B) is considered **INPUT 8** and can be most easily accessed with INPUT 8. Or, if you are using the built-in keypad or the optional "lite" remote, neither of which have a separate INPUT key, use **INPUT 6** to access **INPUT 8** as follows:

- While displaying from **INPUT 6**, press **INPUT 6** again to switch to **INPUT 8**.
- While displaying from any input other than the *Dual SD/HD-SDI Module*, press INPUT. This switches to either **INPUT 6** or **INPUT 8**, depending on which of the *Dual SD/HD-SDI Module* inputs (A or B) was last used. Press INPUT again to display from the other *Dual SD/HD-SDI Module* input.

Input Key (Standard IR Remote Only)

Press INPUT + n (where n = 1, 2, 3, 4, 5, or 6; 7 and 8 optional) as an alternative method for selecting which source to display. Six source locations are identified with input numbers on the projector's input panel. The last two, 7 and 8, require the Dual SD/HD-SDI Module installed in either of the option slots.

If PIP is enabled, INPUT + n changes the PIP (secondary) image source, and INPUT + PIP + n changes the main (primary) image source.

NOTE: *The* INPUT *key behavior depends on whether or not the* ***Display Channel List*** *option is selected in the* Menu Preferences *menu. You can choose to have on-screen feedback when you press* INPUT*, or you may prefer to enter the desired source location "blind", i.e. without on-screen feedback. Refer to* Menu Preferences.

Contrast Key

Press the CONT key on the standard IR remote to change the amount of white in your images. Use the UP Arrow key or DOWN Arrow key until you reach the desired level of white.

NOTE: *For best results, start low and increase so that whites remain bright, but are not distorted or tinted, and that light areas do not become white (i.e., "crushed"). Conversely, low contrast causes dim images. Refer to 3.6.3 Image Settings Menu (****Image Settings*** *subsection).*

Brightness Key

Press the BRIGHT key on the standard IR remote to increase or decrease the amount of black in the image. Use LEFT and RIGHT Arrow keys until you reach the desired level of black. For best results, start high and decrease so that dark areas do not become black (i.e., "crushed"). Conversely, overly high brightness changes black to dark gray, and causes washed-out images. Refer to 3.6.3 Image Settings Menu (***Image Settings*** *subsection*).

Gamma Key

Press the GAMMA key on the standard IR remote to define the **Gamma** setting to best suit your environment. “Gamma” determines what gray shades to display between minimum output (black) and maximum output (white) for a given signal. The proper setting helps maintain optimized blacks and whites while ensuring a smooth transition for the "in-between" values utilized in colors. Thus, unlike brightness and contrast setting controls, the overall tone of your images can be lightened or darkened without changing these two extremes, and all images become more vibrant yet with good detail in dark areas.

The normal *Gamma Table* setting of 2.2 is correct for most signals and conditions. If excess ambient light washes out the image and it becomes difficult or impossible to see details in dark areas, lower the gamma setting to compensate. Conversely, if the image is washed out and unnatural, with excessive detail in black areas, increase the **Gamma** setting. Again, good gamma improves contrast while maintaining good detail for blacks.

Menu Key

Press the MENU key on either the built-in keypad and standard IR remote to enter or exit the projector's *Menu* system.

OSD (On-Screen Display) Key

Press the OSD + the DOWN Arrow key on the standard IR remote to hide the projector's *Menu* system during use.

To see the *Menu* system again, do one of the following:

- Press and hold OSD for a second or two
- Press and release OSD followed immediately by the UP Arrow key
- Press OSD twice quickly

Invisible menus are fully functional, enabling "hidden" access to numbered features and image adjustments by entering the corresponding sequence of keypresses on the remote.

NOTES: 1) *With OSD "ON", you can still hide on-screen error messages and direct slidebars within the Menu Preferences menu.* **2)** *The state of the on-screen display is shown in the LCD window at the rear of the projector.*

Shutter Key

Press *and hold* the SHUTTER key on the standard IR remote for a second or two to toggle the internal mechanical shutter blade closed or open with a single keystroke. Or press and release the SHUTTER key followed immediately by the UP Arrow key (to close) or DOWN Arrow key (to open) to guarantee the correct toggle. This is useful if you are unsure of the present state. Alternatively, press the SHUTTER key twice quickly to toggle from the present ON/OFF state. Close the shutter to blank all display while maintaining access to projector functions. A closed shutter blanks the display (turns it to black) and reduces lamp power to 60% of the maximum rating for 4.5 and 6.0 kW lamps (or 75% for 2.0 and 3.0 kW lamps). Opening the shutter restores lamp power to its previous setting, and restores the image.

NOTES: **1)** *The status of the shutter is shown in the LCD display window at the rear of the projector as"SH" if closed.* **2)** *The shutter opens upon power-up.*

Function Key

If You are Within a Primary or Secondary Menu

You can use the FUNC key on standard IR remote to perform special tasks within the *Menu* system. Each task is discussed within Section 3. For example, you can press FUNC in the *Channel Setup* menu to enable deletion or copying of a channel.

If You are Within a Presentation:

Press the FUNC key on standard IR remote followed by a 2-digit number to enable one or more specific colors in the display (see right). For example, pressing FUNC + 6 + 4 display only red and green data,whereas, FUNC + 6 + 7 displays all color data. Eliminating one or more colors can help with certain diagnostics and setups, such as when accurately overlaying one image on top of another from stacked projectors.

Func 6 1 = Red
Func 6 2 = Green
Func 6 3 = Blue
Func 6 4 = Red & Green
Func 6 5 = Green & Blue
Func 6 6 = Red & Blue
Func 6 7 = All Colors

NOTE: *Color enabling can also be implemented from numerous locations within the Menu system.*

Defining other uses

Through ASCII messaging on a PC, you can also assign special user functions to keys 1 to 5, 7 to 9, and others. For example, the FUNC key can be programmed to trigger RTEs (Real Time Events) or to display custom menus. Refer to the separate ***Christie Serial Communications*** publication.

Projector Key

Press the PROJ key on the standard IR remote to access a specific projector within a group of projectors or to confirm if the local projector is listening. The number in the *Enter Number* window indicates which projector is currently listening to commands, and matches the projector number that has been defined in the *Menu Preferences* menu.

The "Projector" check box (read-only) shows whether or not the projector physically connected to a remote is listening to commands from that remote. A check mark means that connected projector is listening; if there is no check mark, you are communicating with a different projector.

To control a specific projector with the remote, enter the 3-digit number assigned to the projector that you want to use. If you switch to a projector other than the one you are currently using, the check mark disappears.

To broadcast to multiple projectors, press PROJ twice without entering a projector number.

NOTES: 1) *Keypad commands affect all projectors present.* **2)** *There is no method of controlling a group of projectors within the same wired configuration using the wired IR remote exclusively, since there is only one wired protocol available.*

The "Broadcast Keys" option in the *Communications* menu must be selected for only one specific projector in a serial network. The remote in use must be OFF (disabled) for the remaining projectors. Refer to *2.14 IR Remote Protocols and Adjustment* and *3.8 Adjusting System Parameters and Advanced Controls*.

Enter Key

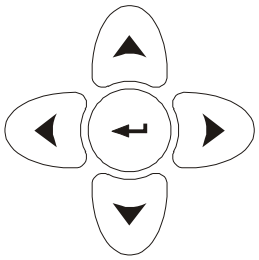
Press the ENTER key on either the built-in keypad and standard IR remote to select a highlighted menu/option item, to toggle a check box, or to accept a parameter adjustment, and return to the previous menu or image.

Exit Key

Press the EXIT key on either the built-in keypad and standard IR remote to return to the previous level, such as the previous menu.

NOTE: *Exiting does not save changes within text editing boxes (including number editing of a slidebar value) or within drop-down lists. It acts as a "cancel" to all changes.*

Arrow Keys



Use the RIGHT and LEFT Arrow keys on either the built-in keypad or the standard IR remote to change a slidebar value or check box, or to select a different option within a drop-down list without having to first scroll through the options. These keys also jump to the next page in long menus. Refer to *3.5.6 Editing Text* later in this section.

Use the UP and DOWN Arrow keys to navigate within a menu, drop-down list or text box. On the standard IR remote, use the ON and OFF keys to force the corresponding state for POWER, SHUTTER, and OSD keys. See details provided on the back of the standard IR remote.

PIP (Picture-in-Picture) Key

NOTE: *PIP performance may be limited by certain high frame rate sources.*

Press the PIP key on the standard IR remote to enable or disable the Picture-in-Picture function. This either allows or prevents the display of two images at once. Typically, PIP displays a smaller "secondary" image within a large "primary" background. While using PIP, source image adjustments can be made (location and resizing) to the secondary image only.

To adjust the main image instead, press the PIP key before the adjustment . For example, press GAMMA + PIP + the RIGHT and LEFT Arrow keys to change the gamma level of the main image.

To remove the secondary image from the display and return to a single image, press the PIP key while no menus or slidebars are present.

For more information on PIP functionality, refer to *Section 3.9 Working with PIP.*

Swap

Press the SWAP key on the standard IR remote to swap the current picture-in-picture relationship so that the primary image becomes secondary, and the secondary image becomes primary.

NOTES: 1) *The* SWAP *key is available on the* standard IR *remote only. Alternatively, a swap can be accessed in the Menu system.* **2)** *Requires PIP.*

Lens Focus, Zoom, and Lens H, Lens V Funtion Keys

The motorized lens control keys (FOCUS, ZOOM, and HORTIZONAL and VERTICAL positioning) are available on both the built-in keypad and the standard IR remote. When adjusting the image for focus, zoom, horizontal, and vertical positioning, use the Arrow keys (LEFT, RIGHT, UP, and DOWN) related to each function. A small window appears to indicate the type of adjustment taking place.

Built-in keypad:

- Press the FOCUS UP or DOWN Arrow buttons to improve the focus of the image.
- Press the ZOOM UP or DOWN Arrow buttons to achieve a desired image size.
- Press the LENS SHIFT + LEFT or RIGHT Arrow buttons to position the image horizontally.
- Press the LENS SHIFT + UP or DOWN Arrow buttons to position the image vertically.

Using the standard IR remote:

- Press the FOCUS + the UP or DOWN Arrow keys to improve the clarity as desired.
- Press the ZOOM + the UP or DOWN Arrow keys to achieve a desired image size.
- Press the LENS H + the LEFT or RIGHT Arrow keys to position the image horizontally.
- Press the LENS V + the UP or DOWN Arrow keys to position the image vertically.

Press EXIT to return to the presentation level.

Backlighting Function

Press the LIGHTBULB key on the standard IR remote to illuminate the remote's keys without sending a command to the projector.

Standard IR Remote Operating Settings (Protocols)

The standard IR remote stores an operating setting called **Protocol** in memory. In some applications, such as when you want to use multiple IR remotes to control different projectors independently, you may want to override the default IR remote protocol set at manufacture (which is "A") for one of the IR remotes. Refer to *2.14 IR Remote Protocols and Adjustment* for complete instructions.

3.3 Power-up Procedure/Checklist

NOTE: *This is a typical manual power-up procedure. Some installations may include an automation system that controls projector start-up and lamp ignition in conjunction with other variables such as lighting, audio and other equipment.*

⚠ WARNING ***Do not attempt operation if the AC supply is not within the specified voltage range.***

The following steps provide a checklist of steps for the Power-up procedure:

1. Make sure that ballast is properly configured for the AC at your site, and that it is connected via 4 cables to the projection head. Refer to *2.8 Connecting the Ballast*.
2. Connect the head to AC power. The voltmeter on the back of the projector indicates the incoming level of AC, and the main PROJ. STATUS light on the rear of the projector should glow a steady yellow. At this point, the projection head is in stand-by mode with only light engine fans running.
3. Connect the ballast to AC power. The 3-phase LEDs and voltmeter should light up.
4. Turn the ballast's breaker/power switch to ON. The internal ballast fan should start up.

NOTE: *The ballast's internal fan is the only indication whether or not the breaker/power switch is ON. Lights on the ballast indicate only that the ballast is plugged in.*

5. Press the MENU key on either the built-in keypad and standard IR remote. The LCD Status Display window at the rear of the projector shows a "Lamp Size" of 2000, 3000, 4500 or 6000 watts, depending on its last setting. The Factory default=6000. Select the lamp that is currently installed, if other than what is shown. Continue if no change is needed. Refer to *Section 2.9.1 Set Lamp Type*.
6. Press and hold the POWER button to turn the projection head ON and ignite the lamp. Refer to *Power (ON/OFF) Key*. The large PROJ. STATUS light on the rear of the projector should glow a steady green.

If the Lamp Does Not Ignite, check:

- If a safety interlock switch is open (such as when the lamp door is ajar), the lamp cannot be struck. The PROJ. STATUS light on the rear of the projector should glow red, and an error appears on the status dislay and LCD window.

- If the lamp fails to ignite even though the interlock system is OK, the projector automatically tries to re-ignite using 100% of the maximum power acceptable for the installed lamp. If this re-try also fails, a new lamp is likely needed.

NOTE: *For complete power-up troubleshooting, Refer to 5 Troubleshooting.*

7. In the *Lamp* menu, set the "Cable Length (m)" to match the length of the DC cables currently connected between your lamp ballast and projection head.

3.4 Power-down Procedure

NOTE: *Describes a manual shutdown only. May be automated.*

1. Do one of the following to turn the projection head and lamp OFF:
   - Press POWER twice quickly
   - Press and hold POWER
   - Press POWER + the DOWN Arrow key

NOTE: *Continue running for approximately 10 minutes, all fans, including the heat extractor to cool the lamp.*

⚠ WARNING *Make sure to wait for the fans to cool!*

2. Turn the breaker/power switch OFF.

3.5 Navigating through the Menu System

Most of the controls for the projector are accessed from within the projector's menu system. There are several groups of related functions, with each group selectable as a menu item in the *Main* menu (see *Figure 3-7*). Press MENU on either the built-in keypad or standard IR remote at any time to display the *Main* menu.

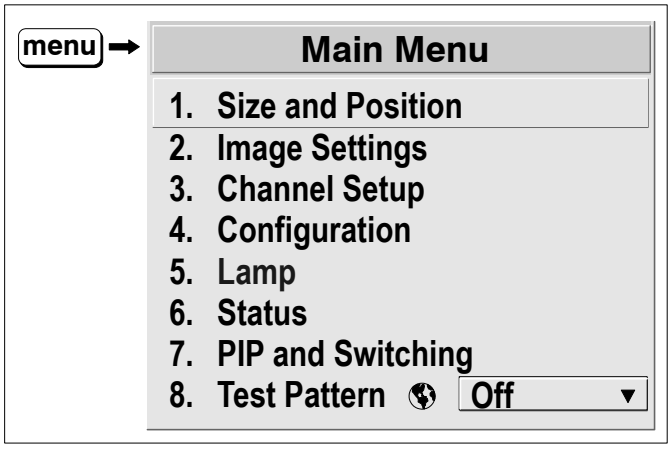


Figure 3-7 Entering the Menu SystemThrough the Main Menu

On the standard IR Remote, either enter the number corresponding to the *Function* menu you wish to access, such as 2 for the *Image Settings* menu. Or use the UP and DOWN Arrow keys on any remote to highlight the desired menu option, then press ENTER. The corresponding *Function* menu or drop-down list appears, presenting further options.

Within a *Function* menu, navigate in a similar manner by entering a *Menu* option number corresponding to a numbered option, or use the UP and DOWN Arrow keys to highlight the desired option, then press ENTER. Extra long menus have a scrollbar along the right-hand side. Use the Arrow keys to move up and down within the menu. Locked items or items that do not pertain to the current action or condition appear grayed out, and cannot be selected.

NOTES: 1) *If there is no signal present, all source-dependent adjustments are disabled.* **2)** *After 15 minutes of inactivity, the projector saves and leaves the Menu system, and returns to the presentation.* **3)** *The Status menu is read-only.*

When finished with a *Function* menu, do one of the following:

- Press EXIT to return to the previous screen
- Press MENU on either the built-in keypad and standard IR remote to leave the *Menu* system, and return to the presentation

3.5.1 On-line Help

If at any time you are uncertain what to do next or what a particular menu option does, press HELP to display summary information (*Figure 3-8*) about the current menu or highlighted option. Press HELP again to exit. If available, a line of "hint" text is included at the bottom of some menus.

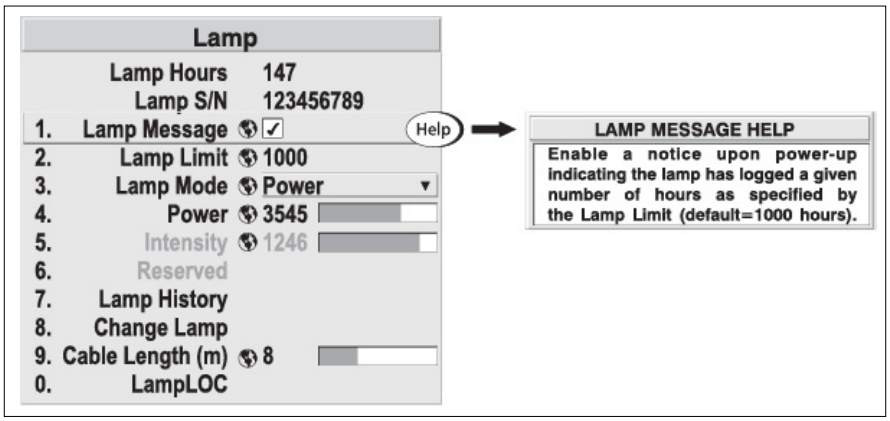


Figure 3-8 Context-Sensetive Help

From the presentation level, press HELP to access general **Help Topics** (*Figure 3-9*). Press ENTER to select a topic. Scroll as necessary within a topic. Press HELP or EXIT to return to your presentation.

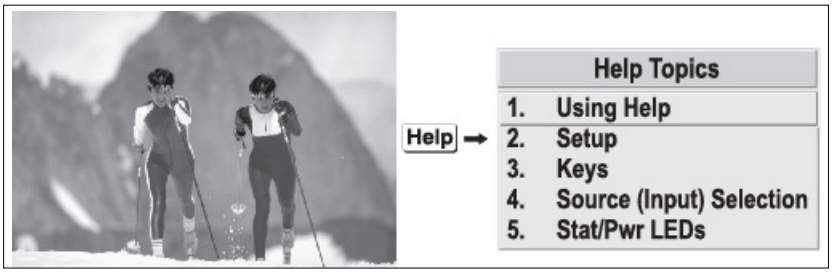


Figure 3-9 Accessing General Help Topics

3.5.2 Time-outs

If a slidebar, menu, or message is present, you have limited time in which to make an entry on the built-in keypad and standard IR remote before the projector returns to its Presentation level, and the HELP graphic disappears. These time-outs may vary depending on what is displaying.

3.5.3 The Global Icon

Menu options that include this icon apply universally to any incoming signal.

3.5.4 The PIP Icon

Menu options that include this icon apply to PIP (secondary) images only.

3.5.5 Using Slidebars and Other Controls

Most of the *Function* menus allow you to change settings by using slidebars, check boxes, and drop-down lists. To select a slidebar, select or clear a check box, or view a drop-down list, do one of the following within a *Function* menu:

- Enter the current menu option number corresponding to the setting you wish to change (for example, press 1+3 to select the *Vertical Stretch option* in the *Size & Position* menu).
- Move UP or DOWN to highlight the desired option, and press ENTER to select.
- Or move the highlight to the option desired, and press the RIGHT and LEFT Arrow keys to adjust immediately.
- Or bypass the menus entirely, and use a single key to immediately access an adjustment during your presentation (applies only to options which have their own key on the standard IR remote, such as CONtrast, BRIGHTness, GAMMA, etc.).
- For "blind" access, hide the entire *Menu* system (refer to *OSD (On-Screen Display) Key*, above) and/or direct slidebarslidebars activated by their own key (such as CONtrast, BRIGHTness, etc.). Control by using the proper keypress or numerical sequence of key presses.

Once selected, change the setting as desired (see below). Changes take effect immediately and are saved upon exit from all menus, or after 15 minutes.

Slidebars in Menus

The current value for a given parameter, such as size or vertical stretch, appears to the left of its slidebar icon (Adjustment window). This number often expresses a percentage, or it may have units associated with it (such as pixels, degrees Kelvin, etc.), depending on the specific option. Press the RIGHT or LEFT Arrow keys to gradually adjust the setting up or down-both the number and the length of the bar change accordingly. Hold for continuous adjustment. Or press ENTER to activate a slidebar text box for a specific number entry via the built-in keypad or standard IR remote, then press ENTER to save (or press EXIT to cancel).

"Direct" Slidebars

For quick access, you can access Gamma, Brightness, and Contrast slidebars without traveling through the *Menu* system. For example, simply press CONT to immediately display the same CONTRAST slidebar accessed with the *Contrast* option in the *Image Settings* menu.

Use the Arrow keys to adjust a direct slidebar, or press ENTER and type a specific number from the built-in keypad or standard IR remote, then press ENTER or the RIGHT or LEFT Arrow keys to save (or EXIT to cancel). When you are done, press EXIT to save and return to your presentation.

NOTES: 1) *You can still adjust a direct slidebar as usual if the display is turned OFF (refer to OSD (On-Screen Display) Key or the Menu Preferences) except the slidebar is not visible.* **2)** *A direct slidebar disappears if it is not used within 5 seconds.*

Check Boxes

Conditions are present if its adjacent check box contains a check mark. To select or clear a check box, simply highlight and press ENTER, or highlight and press the RIGHT Arrow key to select or LEFT Arrow key to clear. If a check box is numbered, simply enter its number to immediately toggle (select or clear) the check box.

Drop-down Lists

To view a drop-down list of options available for a given parameter (labeled with a inverted triangle shaped icon), you can either highlight the parameter and press ENTER, or enter the *Menu* option number.

Press the UP and DOWN Arrow keys to navigate within the list. Press ENTER to select a highlighted option from the list, if desired.

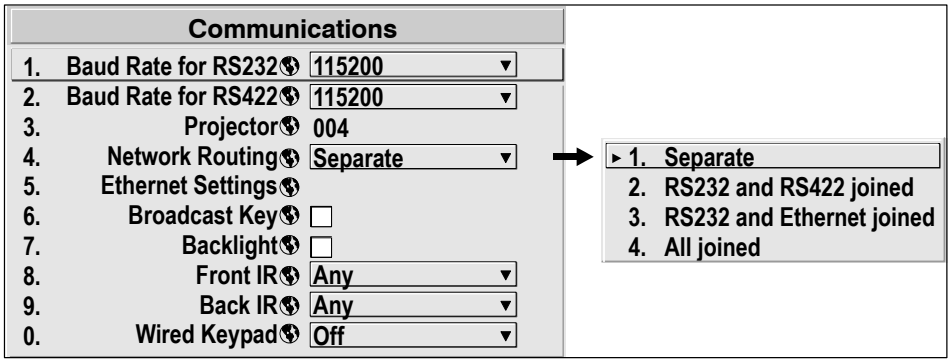


Figure 3-10 Example of Pull-down List

Or, if you prefer to quickly scroll through an option list without using its drop-down list, you can use the LEFT and RIGHT Arrow keys to locate and highlight the desired option.

NOTES: 1) *Press* the RIGHT or LEFT Arrow keys *to jump between pages in an extra long drop-down list.* **2)** *Press* EXIT *while in a drop-down list to cancel any change(s) and exit.*

3.5.6 Editing Text

Activate the Edit Window

To enter or edit text, highlight the desired parameter (such as a Channel name) and press ENTER to activate its adjacent *Edit* window. Any previously entered text appears with its first character highlighted in a square cursor (*Figure 3-11*), signifying that this character is the starting point for editing.

Navigate Within the Edit Window

Press the RIGHT Arrow key to move the cursor forward or the LEFT Arrow key to move the cursor backwards, character by character, as desired.

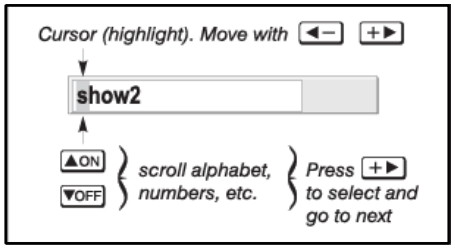


Figure 3-11 Entering Text

Edit a Character

To edit a highlighted character, press the UP and DOWN Arrow keys to scroll through the alphabet, numbers, spaces, and punctuation marks available. When the character you need appears, press the RIGHT Arrow key to select, and replace the current character. The cursor moves to the next character within the current text string, if present. You can also enter a number directly from the built-in keypad or standard IR remote. The digit is accepted and the cursor moves to the next character space.

Add or Delete a Character or Space

To insert a space at the cursor location, press FUNC + the RIGHT Arrow key. To delete a highlighted character (or space), press FUNC + the LEFT Arrow key.

Figure 3-12 Editing Text

Press Enter when Finished

To accept all edits made and close the *Edit* window, press ENTER.

NOTE: *Press* EXIT *at any time to cancel changes and redisplay the previously defined text.*

3.5.7 Editing Numerical Values

Enter numbers directly from the built-in keypad or standard IR remote in order to specify numbers representing projectors, channels (source setups), or slots. As each digit is entered, it displays and the cursor moves on. Note that Channels are assigned 2-digit numbers. For example, if you enter only a single digit (such as "7") for a channel number, the channel automatically changes to "07". Enter "07" to utilize this channel.

NOTES: 1) *Once you enter the first digit, this digit over-writes the current entry.* **2)** *If you press any non-numbered keys, the number entered up to that point is accepted, and updated as the new value. 3) Press* EXIT *to cancel editing of numerical values.*

3.6 Adjusting the Image

The most commonly used options for image adjustments are accessed through the following 2 Main menu options:

- *Size and Position*
- *Image Settings*

From either of these two menus, you can change settings affecting the image from the current channel by working with the appropriate slidebars, check boxes, and drop-down lists.

Pressing EXIT returns you to the previous menu (or to the presentation, if from the *Main* menu), and accept any changes you may have entered. Settings are saved for the current channel.

From your presentation, you can access any of the individual options in these menus by pressing MENU, followed by the appropriate two-digit number representing their location in the Menu system. For example, press MENU + 2 + 3 to quickly access the "Gamma" option in the *Image Settings* menu.

For certain options, you may prefer to use a "direct key" from the presentation level to go directly to a particular menu option without traveling through the Menu system (*available for certain display parameters only*). For example, press CONT to access the "Contrast" slidebar immediately. Press EXIT to return to your presentation.

NOTES: 1) *To hide these "direct" slidebars, disable the" Display Slidebars" check box in the Menu Preferences menu.* **2)** *To hide the entire Menu system from view, turn OFF the on-screen display by pressing the* OSD *key.*

3.6.1 Before You Begin

Using Auto Setup

For a most efficient first step in perfecting the image, press AUTO SETUP on the built-in keypad or AUTO on the standard IR remote. This initiates an automated process in which the projector quickly optimizes critical display parameters such as size, position, pixel tracking, etc., based on the type of incoming source data detected. An *Auto Setup* can save considerable setup time, and you can still modify the display parameter settings as desired using the menu options described below.

3.6.2 Size and Position Menu

Select *Size and Position* (option # 1) from the *Main* menu. To increase or decrease the size of your image, change its proportion (aspect ratio), move the image to a specific area of the screen, and refine other related parameters. Use *Size and Position* controls to match the image precisely to the screen used at the site.

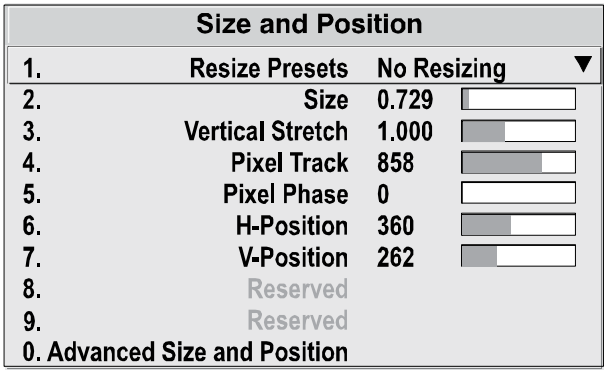


Figure 3-13 Size and Position Menu

Refer to *Section 3.5.5 Using Slidebars and Other Controls* if you need help using any of the options and controls. Changes made in the *Size and Position* menu are applied immediately and are saved when you exit the menu (press EXIT or MENU).

Resize Presets Option

Select the *Resize Presets* option from the *Size and Position* menu. This option quickly displays an image in its native resolution or to automatically resize an image to closely fill the projector's native resolution of 2048 x 1080, or to optimize the width or height of your display. Size, Position, and Blanking parameters automatically adjust accordingly. Or, if Blanking is set first, which defines an Active Input Area, Resize Preset, scaling occurs in this region of interest only.

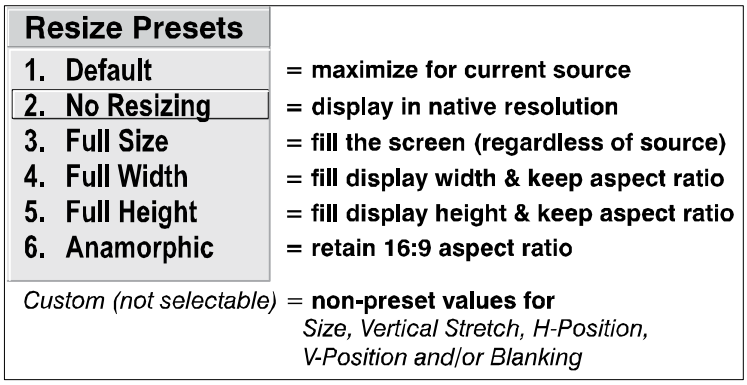


Figure 3-14 Resize Presets Drop-down List

What is the Resizing Default?

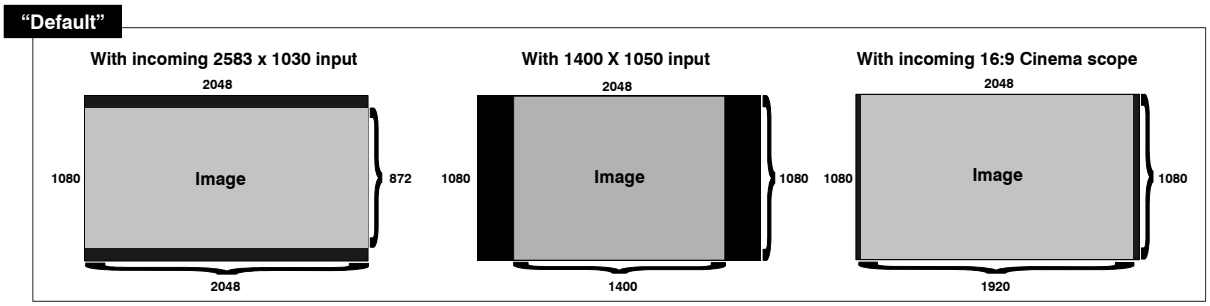
By default, when displaying a new source, your image utilizes as much of the projector's display area (2048 x 1080) as possible for the type of incoming source data, but with minimal changes to aspect ratio. For example, incoming signals having a more "square" aspect ratio than that of the projector will be maximized to approximately 1080 pixels from top-to-bottom, with the image centered between black side bars. Refer to *Default Option* below.

Default Option

Select *Default* for most sources (factory default). The image is centered and displays as large as possible (without affecting aspect ratio), depending on the type of input source, as described below:

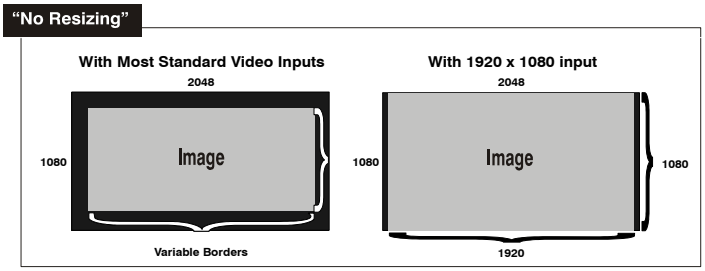
- the image enlarges to fill the screen height or width, and is centered between black bars
- a 16:9 image fills the height with black bars on both sides.

NOTE: *Images and resolutions are shown for example only.*



No Resizing Option

Select *No Resizing* to display the image in its native resolution, which is probably smaller than the projector's 2048 x 1080 resolution. For example, for a source with a native resolution of 800 x 600, the "No Resizing" centers a small image within a black border. The black border areas are unused areas.

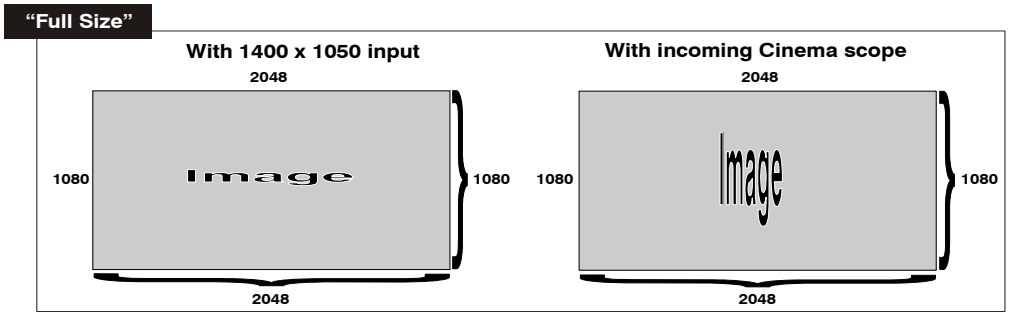


When "Custom" Appears

The ***Custom*** re-size descriptor automatically appears in the *Size and Position* menu when any of the values for Size, Vertical Stretch, H-Position, V-Position or Blanking do not correspond to those for a preset. This option is not a choice in the ***Resize Presets*** drop-down list.

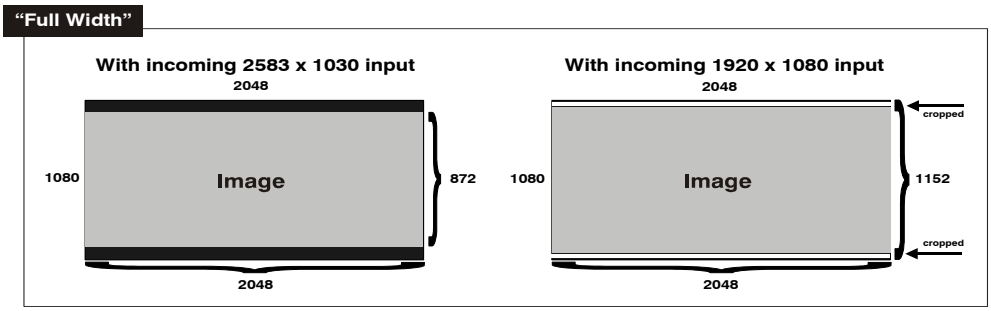
Full Size Option

- Select *Full Size* to use all pixels (2048 x 1080) for displaying the image, regardless of source or original aspect ratio.



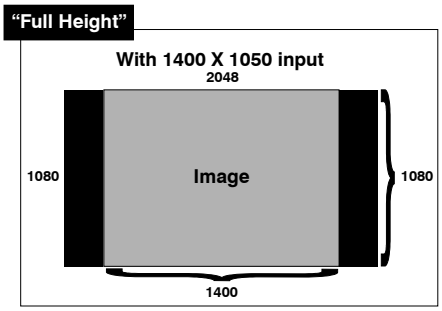
Full Width Option

- Select *Full Width* to fill the projector's display from left-to-right without changing the original aspect ratio of the image. Depending on the source, data at the top and bottom may be discarded (cropped), or the display may have black borders at the top and bottom.



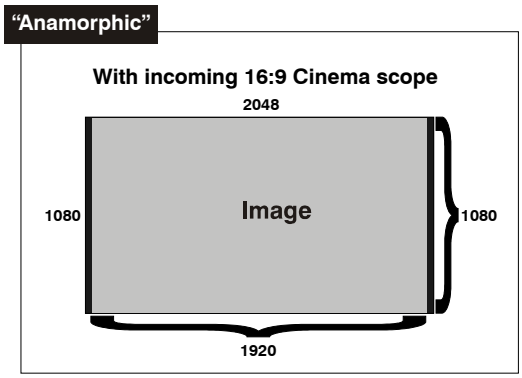
Full Height Option

- Select *Full Height* to fill the display from top-to-bottom. Depending on the source, this may create borders.



Anamorphic Option

- Select *Anamorphic* to display an incoming Cinema scope signal in a 16:9 aspect ratio without the use of an anamorphic lens mount. The image fills the screen from top-to-bottom, and be centered between narrow black bars on each side.



Size Option

Select the *Size* option from the *Size and Position* menu. Size controls both the image *width* and *height* in tandem, maintaining the current aspect ratio (proportion) of the displayed signal data.

Vertical Stretch Option

Select the *Vertical Stretch* option from the *Size and Position* menu. Vertical stretch adjusts the *height* of the image while keeping the width constant. Use *Vertical Stretch* to change the aspect ratio of the display.

Pixel Track Option

Select the *Pixel Track* option from the *Size and Position* menu. Steady flickering or several soft vertical stripes or bands across the entire image indicates poor pixel tracking. Proper pixel tracking helps ensure that the image quality is consistent across the screen, that aspect ratio is maintained, and that pixel phase can be optimized (described below). Tracking determines the frequency of the pixel-sampling clock, indicated by the number of incoming pixels per line, so that all pixels generated by a particular source are sampled.

NOTE: *By default, the projector samples at the correct frequency for most sources.*

For best results, use a good test pattern such as a smooth gray consisting of a clear pattern of black and white pixels, or a similar "half on, half off" graphic image, such as the Windows shutdown screen. Adjust the slidebar until the vertical stripes broaden to the point where one large stripe fills the image. If the image still exhibits some shimmer or noise, adjust the Pixel Phase described next.

Pixel Phase Option

NOTE: *Adjust Pixel Phase **after** Pixel Tracking.*

Select the *Pixel Phase* option from the *Size and Position* menu. Adjust pixel phase when the image (usually from an RGB source) still shows shimmer or "noise" after pixel tracking is optimized. Pixel phase adjusts the phase of the pixel-sampling clock relative to the incoming signal.

For best results, use a good test pattern such as a smooth gray consisting of a clear pattern of black and white pixels, or a similar "half on, half off" graphic image, such as the Windows shutdown screen. Adjust the slidebar until the image stabilizes and each pixel is clearly defined. You may notice that you can stabilize the image at more than one point-i.e., you may find that the image appearance at "11" is identical to the image appearance at "38", thus you can use either setting.

If some shimmer from a video or HDTV source persists, use the "Filter" control to remove high-frequency noise from the signal.

H-Position Option

Select the *H-Position* option from the *Size and Position* menu. This option moves the image right or left within the area of available pixels.

NOTE: *The value shown represents where the approximate center of the image lies in relation to the total number of pixels available horizontally. This varies widely according to the signal-watch the image while adjusting.*

V-Position Option

Select the *V-Position* option from the *Size and Position* menu. This option moves the image up or down within the area of available pixels.

NOTE: *The value shown represents where the approximate center of the image lies in relation to the total number of pixels available vertically. This varies widely according to the signal-watch the image while adjusting.*

Advanced Size and Position Secondary Menu

This secondary menu consists of the following options:

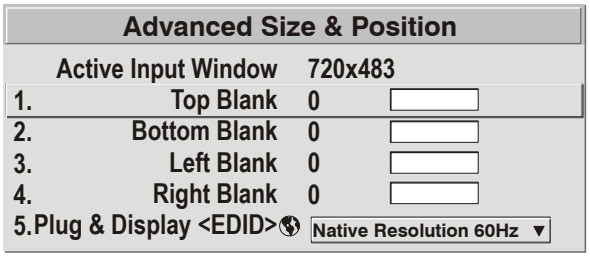


Figure 3-15 Advanced Size and Position Secondary Menu

Active Input Window Option

Select the *Active Input Window* option from the *Advanced Size and Position* menu. This read-only parameter indicates the current size (i.e., area) of your displayed data or "region of interest" as defined by the blanking controls. For example, if you have blanked (cropped) 100 pixels from both the left and right edges of an incoming source of 2048 x 1080, the remaining active input window is 1848 x 1080. When using a video source at **INPUT 3** or **INPUT 4**, the default blanking of "0" defines an active input window of 720 x 483for NTSC video.

Blanking (Top, Bottom, Left, and Right) Options

Select a *Blanking* option from the *Advanced Size and Position* menu. Crop the image as desired so that unwanted edges are removed from the display (changed to black as shown in Figure 3-16). Blanking defines the size of the *Active Input* window, creating an area of interest. Range of adjustment depends on the source resolution and other factors for your application.

NOTE: *Blanking a PIP image resembles zoom (refer to Figure 3-31). For example, left Blanking zooms the right side of the PIP image; Right Blanking zooms the left side. There are no black bars.*

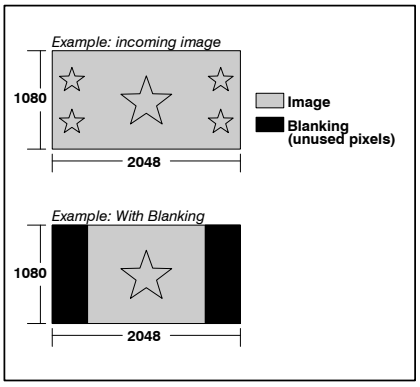
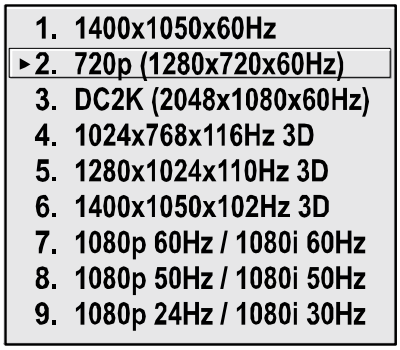


Figure 3-16 Blanking of a Primary Image

Plug & Display (EDID) Option

Select the *Plug & Play* option from the *Advanced Size and Position* menu. By default, a *Plug & Play (EDID)* source outputs a signal according to the EDID information provided by the projector. To override this information and display in a different format (for example, if your *Plug & Play [EDID]* device does not support the projector's resolution and/or frequency), select the desired *Plug & Play (EDID)* resolution from the list.



Any daisy-chained projectors also displays according to the chosen *Plug & Play (EDID)* format.

EDID = Extended Display Identification Data standard.

3.6.3 Image Settings Menu

Select the *Image Settings* (#2 option) from the *Main* menu. Options in the *Image Settings* menu alter your image without affecting its size or position. Changes made to the *Image Settings* menu are applied immediately and are saved when you exit the menu. Options not available for the projector model or source are disabled and appear dim (gray).

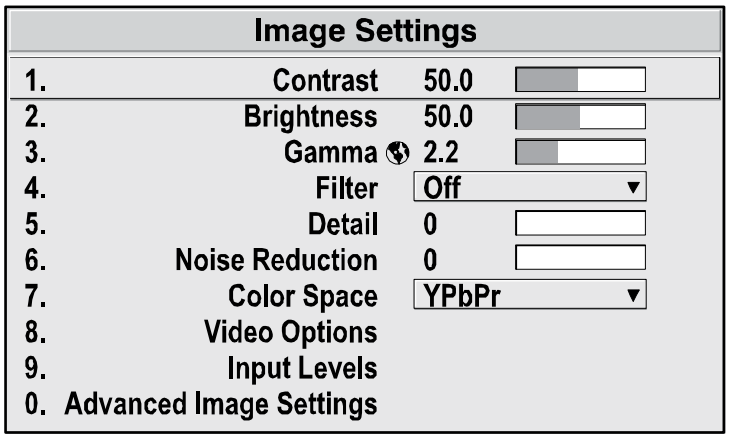


Figure 3-17 Image Settings Menu

Contrast Option

Short Cut: Press CONT on the standard IR remote and adjust the ***Contract*** slidebar in the menu.

Select *Contrast* from the *Image Settings* menu. "Contrast" increases or decreases the perceived difference between light and dark areas of your image (0-100). For best results, keep close to 50. If the contrast is set too high, the light parts of the image lose detail and clarity. If the contrast set too low, the light areas will not be as bright as they could be, and the overall image will be dim. For best results, start with a low value and increase so that whites remain bright , but are not distorted or tinted, and that light areas do not become white (i.e., are "crushed").

NOTE: *If the environment lighting changes, an adjustment of Gamma is recommended (see below).*

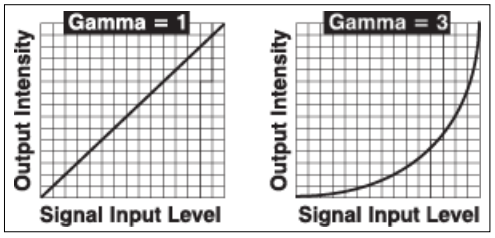
Brightness Option

Short Cut: Press BRIGHT on the standard IR remote and adjust the ***Brightness*** slidebar in the menu.

Select *Brightness* from the *Image Settings* menu. "Brightness" increases or decreases the amount of black in the image (0-100). For best results, keep close to 50. Start with a high value and decrease so that dark areas do not become black (i.e., are "crushed"). Conversely, high brightness changes black to dark gray, causing washed-out images.

NOTE: *Brightness affects contrast, and should be adjusted first.*

Gamma Option



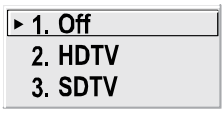
Short Cut: Press GAMMA on the standard IR remote and adjust the ***Gamma*** slidebar in the menu.

Select *Gamma* from the *Image Settings* menu. "Gamma" is a global setting that determines what gray shades are displayed between minimum input (black) and maximum input (white) for all signals. A good gamma setting helps to optimize blacks and whites while ensuring smooth transitions for the "in-between" values utilized in other colors.

Thus, unlike brightness and contrast settings controls, the overall tone of your images can be lightened or darkened without changing the extremes, and all images display more vibrantly while still showing good detail in dark areas.

Gamma fine-tunes the gamma table currently in use, ranging from 1- 3 (default = 2.2, indicating that the chosen gamma table has not been adjusted). If excess ambient light washes out the image and it becomes difficult or impossible to see details in dark areas, lower the gamma setting to compensate. This improves contrast while maintaining good details for blacks. Conversely, if the image is unnatural with excessive detail in black areas, increase the setting. For more information, refer to the *Gamma Table* and *Figure 3-29*. Again, look for good contrast and good details in very dark areas.

Filter Option



Select *Filter* from the *Image Settings* menu. The proper **Filter** setting is automatically set for virtually all signals, and rarely needs to be changed. It applies a low pass filter for noise reduction in the incoming input signal, particularly for HDTV or SDTV. Applied in the analog domain before sampling, this filtering removes high frequencies and thus reduces pixel phase noise (note this also reduces signal bandwidth). Override only if standard pixel tracking and phase adjustments do not adequately clear up a "noisy" video signal, or if a graphics signal appears overly "soft". Both instances indicate that "Filter" may be set to the wrong option.

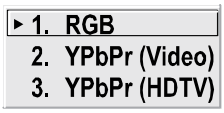
Detail Option

Select *Detail* from the *Image Settings* menu. "Detail" adjusts the sharpness of a video image so that edges remain clearly defined. It can be particularly useful if a significant "Noise Reduction" adjustment has caused the image to appear too soft. Adjust until the display is as sharp as desired, keeping in mind that because "Detail" adds some high frequencies back into the image, it can also re-introduce a certain degree of noise.

Noise Reduction Option

Select *Noise Reduction* from the *Image Settings* menu. Noise reduction is similar to the "Filter" control, but operates in the post-sampling digital domain with a more subtle effect. Higher settings are most useful for clearing up noisy RGB images such as those from a PC. Adjust as desired, keeping in mind that reducing noise (which reduces high frequencies) may also soften the image.

Color Space Option



Select *Color Space* from the *Image Settings* menu. "Color Space" determines how the color components of an analog input signal or certain digital signals connected to **INPUT 1**, **INPUT 2**, **INPUT 5,** or **INPUT 6** are decoded for accurate color in the display. Although color space for these analog signals is automatically determined by the projector, in some circumstances you may wish to override this and manually set a specific color space.

NOTE: *For most digital signals or for signals connected to* **INPUT 3** *or* **INPUT 4***, the color space function is entirely automatic and the drop-down list disabled.*

The current color space appears in the *Image Settings* menu. Press ENTER to select a different option:

- Select **RGB** unless you are using component video at **INPUT 1**, **2**, **5**, or **6**.
- Select **YPbPr** (Video) with a standard definition televised signal (SDTV)
- Select **YPbPr** (HDTV) with a high definition televised signal (HDTV).

NOTE: *When certain RGB signals are first connected, the projector may not initially recognize them as RGB and incorrectly decodes their color information as YPbPr (video). These signals can include:*

- *RGB signals in NTSC, PAL, SECAM frequency ranges*
- *Scan-doubled sync-on-green*
- *Scan-quadrupled sync-on-green*

For these signals, change the Color Space to RGB, then define a new channel for future use.

Video Options Secondary Menu

Select *Video Options* from the *Image Settings* menu. This secondary menu is used with video sources only (Inputs 3 or 4).

NOTE: *Best results are obtained with defined channels. Otherwise, switching from one video source to another can sometimes cause slight disturbances in the display, indicating that the Auto function is struggling. Recover by briefly selecting a different video standard, then going back.*

Enable Decoder AGC Option

Select *Enable Decoder AGC* from the *Video Options* menu. Automatic Gain Control (AGC) affects decoded video images only. Enter a check mark (default) in most instances to activate the decoder's AGC circuit and ensure properly bright images. Delete the check mark if a decoded video image exhibits strange color artifacts such as stripes in highly saturated colors, indicating an incompatibility between this source and the AGC.

Video Standard Option

Select *Video Staandard* from the *Video Options* menu. With the exception of the more unusual video standards available in the world, the projector automatically detects the incoming horizontal and vertical frequencies and sets the projector's processing of this signal to the corresponding standard. The current video standard name appears in the *Video Options* secondary menu, and includes an "A" if it has been auto-detected. Press ENTER to view or select a different video standard from those available to the projector-any that are disabled have frequency characteristics that differ from those of the incoming signal. Selecting a specific standard forces the projector to process the signal according to this standard.

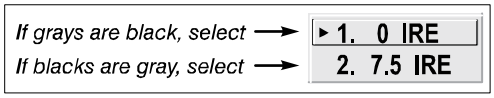
Table 3.4 Regions and Video Standards: Summary

Standard	Where Used (SUBJECT-TO-CHANGE)
NTSC	N. America and Japan
NTSC 4.43	A tape-only standard for partially-translated hybrid signals
PAL	Most of Europe, China, Australia, some of S. America, some of Africa
PAL-M	Brazil
PAL-NC	Argentina, Chile, other Latin American countries
PAL 60	Most of Europe
SECAM	France, Eastern Europe, most of Africa

NOTE: *Generally, use "Auto" for all instances EXCEPT: 1) a poor quality input signal or 2) a black-and-white video signal. In order to detect and display such signals, select the relevant standard from the list.*

Input Video Black Option

Select *Input Video Black* from the *Video Options* menu. This control compensates for incoming elevated black levels present in certain video signals, and ensures that blacks in the display are neither crushed (i.e., where dark grays appear black) nor excessively elevated (i.e., where blacks appear dark gray).



By default, the projector automatically determines the best setting according to the type of incoming video signal:

- **0 IRE** - Used for DVD output with "enhanced black", SECAM, most PAL standards, and Japanese NTSC.
- **7.5 IRE** - Used for most NTSC video signals.

For some types of video, you can override the setting. The control is disabled for other types of video (and all graphics sources). Generally, if black appears crushed when brightness = 50, choose "0 IRE". If black appears excessively elevated, use "7.5 IRE".

Color Option

Select *Color* from the *Video Options* menu. This slidebar adjusts the color saturation level, i.e. the amount of color in a video image. Lower settings produce less saturated colors - for example a setting of "0" produces a black and white image. If the color level is too high, colors will be overpowering and unrealistic.

Tint Option

Select *Tint* from the *Video Options* menu. This slidebar adjusts the red/green color hue for true color reproduction of video and HDTV signals connected to **Input 3** or **4**. For best results, adjust the tint while displaying an external test pattern-otherwise, it is recommended that tint remain at its default setting.

Decoder Luma Delay Option

Select *Decoder Luma Delay* from the *Video Options* menu. This control affects any incoming composite or S-video signal, delaying the luma signal (intensity) in relation to the chroma (color). In the image, increasing the luma delay moves luma (seen as a shadow where colors overlap) to the right slightly, with colors remaining in place. Decreasing this delay moves the shadow slightly to the left. If necessary for your current source, adjust so that no shadows occur with adjacent colors.

Input Levels Option Menu

Select *Input Levels* from the *Image Settings* menu.

NOTES: 1) *Because the projector automatically optimizes input levels for all , but the most unusual of sources, it is recommended that only experienced users use the Input Levels secondary menu.* **2)** *Before beginning, check that overall contrast and brightness settings are near 50 and that color temperature is properly set up on an internal grayscale test pattern.* **3)** *There must be at least 6-12 consecutive white pixels present in the image for proper "Auto Input Level" function. Leave this control off after use.*

Good RGB or input levels (that is, the drives and blacklevels for each of the three colors, red, green and blue) ensure that images from analog sources, other than decoded video, have maximum contrast without crushing black or white. By default (and in an "Auto Setup"), the projector automatically determines the best input levels by monitoring image content and adjusting the controls appropriately. It is not necessarty to make further adjustments to obtain proper blacks or whites.

NOTE: *This automatic adjustment requires at least **6-12 consecutive white pixels** in the image. Without these pixels, input levels may produce skewed colors, particularly in non-video images.*

However, for a very unusual source exhibiting one or more overly high blacklevels (typically caused by a noisy source causing blacklevel spikes), an experienced user may prefer to use the Input Levels menu (shown above). These adjustments, which together serve as a calibration process compensating for differences in sources and cabling, enable an experienced user to perfect the source image input levels and eliminate the "overshoot" and "undershoot".

NOTE: *Input Levels are of limited use with digital signals, but do offer some ability to tweak poorly mastered source materials.*

Auto Input Level

Select *Auto Input Level* from the *Input Levels* menu. Keep OFF for virtually all sources (default). If you are an experienced user, you can temporarily select the check box if you have an unusual input source that you feel needs further color temperature and/or input level adjustment. This compensates for incoming out-of-range drives (white) and blacklevels (black) that would cause "crushing" of light and dark colors in the image. Once the six slidebar values stabilize, clear the check box, and EXIT. The **Auto Input Level** should be automatically turned OFF (check box cleared) upon exit.

Blacklevels and Drives

To check your image and adjust these controls:

1. Make sure overall ***Contrast*** and ***Brightness*** are both set to near 50.
   - CONT = 50 (approx.)
   - BRIGHT = 50 (approx.)

NOTE: *Not required for "Auto" adjustment.*

2. Check the color temperature setup using an internal grayscale test pattern, making sure to obtain a neutral grayscale.

NOTE: *Not required for "Auto" adjustment.*

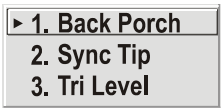
3. Confirm that you are using an analog source not connected to **INPUT 3** or **INPUT 4**, as input levels are not applicable for digital sources or sources going through the decoder. A grayscale is recommended.
4. If the blacks and/or whites appear OK, input levels do not need adjustment. If black levels are too high (and/or whites are too low, which is rare), you likely have a noisy source that is producing skewed input levels. Continue with Step 5.
5. Temporarily enable "*Auto*" in the *Input Levels* secondary menu. Wait for all 6 values to stabilize. Alternatively, do not use "Auto", but reduce blacklevels manually instead. Judge by eye and change one or more of the six levels as necessary to obtain proper blacks and whites. You may want to see only a certain color while adjusting by using the "*Auto Color Enable*" option (described below).
6. Delete the "Auto" check mark and leave the *Input Levels* menu.

IMPORTANT! *Do not use Input Levels to adjust color temperature. This distorts the Contrast and Brightness functions, as well as color temperature.*

Auto Color Enable

When a check mark is present, selecting a specific blacklevel or drive to adjust automatically enables the corresponding color in the display. Remove the check mark to see all colors, or to enable a different specific color through the *Color Enable Control*.

Clamp Location



This option (formerly known as “sync tip clamping”) can brighten the image produced from certain high-resolution high-frequency graphic sources. For almost all sources, the projector automatically selects the best clamp location. Use the normal Back Porch location if the image is either sufficiently bright or overly bright. Select **Sync Tip** if the image appears unusually dim, if there are horizontal streaks across the image, or if there is significant color drift. This moves the clamping pulse from the normal backporch location (which is likely too short) to the tip of the horizontal sync pulse. Tri Level is typically recommended for an HDTV source, where the back porch is also short.

Color Enable

Select which color or colors you want to see in the display, useful while working with color temperature white levels or input levels.

Peak Detector

The Peak Detector is a fast method for defining individual input levels, and can improve the accuracy of input levels set by the Auto Input level function. Enabling the **Peak Detector** activates a special operating mode for detecting only pixels that are considered black or white; all other levels are displayed as a mid-level gray. When used with a smooth grayscale pattern in which black and white are known to be at opposite edges of the image, you can watch these isolated areas while adjusting individual blacklevels and input drives until both black and white edges are just visible and distinguished from neighboring pixels. Images from this source then displays correct blacks and whites without crushing or washing out. Refer to *Figure 3-18*.

1. Display a 16-level grayscale test pattern from the desired external source, and select the Peak Detector check box.

NOTE: *The "Peak Detector" initially renders the grayscale as a uniform gray field before adjustment.*

2. Display one primary color (use the *Color Enable* option to automatically select as you go).

3. For the current color, adjust its corresponding "Blacklevel" slidebar just until a single band of black appears at one edge of the screen. This band represents the first band of the grayscale pattern, which should be 100% black. Do not adjust too far.
4. With the same color still active, adjust its corresponding "Input Drive" slidebar just until a single band of color appears at the opposite edge of the screen. This band represents the last band of the grayscale pattern, which should be 100% white (or the current color, if a certain color is enabled). Do not adjust too far.
5. It may be advantageous to go back and check the black band. You can adjust the blacklevel using the slidebar if necessary.

NOTE: *Re-adjusting blacklevels at this point affects the gain; only re-adjust if absolutely necessary. Adjust until both bands are **just** optimized.*

6. Repeat Steps 2-5 with the other two remaining primary colors. When each primary color shows ***one*** optimized black band and white (or colored) band, the input levels for this source are correctly set. Upon exiting the *Input Levels* menu, the Peak Detector check box is cleared.

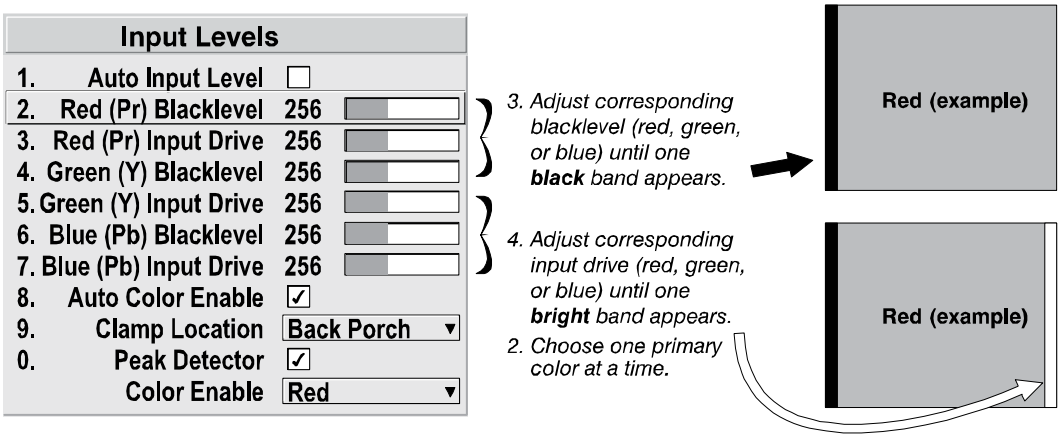


Figure 3-18 Adjusting Input Levels Using the Peak Detector (*RED EXAMPLE SHOWN*)

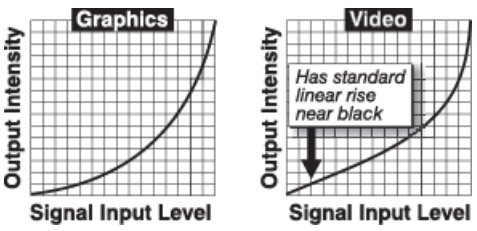
Advanced Image Settings

Use the *Advanced Image Settings* secondary menu to adjust lesser-used options used for more specialized applications.

Gamma Table

This control applies a default video, graphics or simple gamma table or "curve" to your images, controlling the intensity of midlevel colors and producing maximum contrast, brightness and color performance.

As shown at right, the graphics curve is a simple power curve while the video curve has a linear segment near black to compensate for increased blacklevels typical of video signals. A simple gamma curve is a value of 2.2 and is correct for most signal conditions. Although the projector automatically applies either the graphics or video curve according to what type of incoming signal is detected, in some cases you may wish to override this default and use graphics gamma for a video source or video gamma for a graphics source.



Alternatively, if neither default is ideal, you may prefer to apply the simple (non-optimized) gamma curve or a user-defined custom gamma curve that has been created externally, named, and downloaded to the projector (requires separate PC-based Arbitrary Gamma and KoRE Librarian software applications). If any of these special user curves have been installed, their names appear in the *Gamma Table* drop-down list.

Keep in mind that any Gamma Table choice sets the related Gamma value (shown in the *Image Settings* menu) to a 2.2 default, where it can be fine-tuned as desired. Different values (1-3) here indicate that the original gamma table has been adjusted with either the Gamma slidebar or direct key.

Select Color Adjustment

In "Select Color Adjustment", choose an overall color performance for all images. The "Max Drives" factory default simply drives all 3 colors at their maximum level so that they are fully on and cannot be changed. The two other pre-defined color adjustment choices-*SD Video* and *HD Video*-apply a color gamut optimized for video sources (standard or high-definition). Alternatively, you can specify a color temperature, which enables the nearby Color Temperature slidebar and applies its current setting (default = 6500K).

If none of the pre-defined "Select Color Adjustment" options or color temperatures suit your application, select one of four color gamuts previously defined by a user (User 1, 2, 3, 4). A "User" option applies a customized color performance in which the user has precisely set the hue and intensity of each color component in the Color Adjustment by X/Y or Color Saturation secondary menus, and is most often needed with multiple-projector applications. Select the color adjustment producing the best color accuracy for your application and installation.

To configure a "User" color adjustment (gamut), use either the Color Adjustment by X/Y or Color Saturation secondary menu.

NOTES: 1) *"Color Temperature" defaults to 6500K until changed. All four "User" options default to SD Video unless the user has redefined them.* **2)** *Factory-defined color primaries, which ensure consistent color gamut from projector-to-projector, can be altered in the Service menu only. If you suspect alteration, the factory settings can be recovered with selection of* ***Reset to Factory Defaults****? in the Service menu (password-protected).*

Color Temperature

Adjust to apply a specific color temperature to all displays. Color temperatures are expressed in degrees Kelvin (3200-9300K), and utilize different combinations of the projector's original native color primaries to produce a "coloration" or cast (reddish or bluish) in images-the lower the temperature, the more reddish the cast; the higher the temperature, the more bluish the cast.

NOTE: *The slidebar is only enabled if you have a source connected, and have selected "Color Temperature" in the adjacent "Select Color Adjustment" drop-down list in the Advanced Image Settings menu.*

Reserved. No function.

Simulation 3D

From the *Advanced Image Settings* menu, use the *Simulation 3D* secondary menu options to make timing adjustments for realistic simulation environments.

Frame Delay Monitor

This slidebar monitors the latency between input and output. For best results, the bar width and value should remain fairly constant, indicating that timing of input and output frames is locked; the Frame Delay Monitor value should stay within 5-10 lines or so of the Frame Delay setting. If a frame is lost or "dropped", the slidebar moves suddenly and the values change, indicating that the frame input is no longer equal to the output.

Reserved. No function.

3D Stereo Sync Locking. Not available in this projector. May be shown as "Reserved".

3D Stereo Sync Select. Not available in this projector. May be shown as "Reserved".

3D Stereo Sync Delay. Not available in this projector. May be shown as "Reserved".

Frame Lock Enable. This option allows the projector to control the output frame timing based on the input signal. The *Locked* option forces (if possible) the output image to be phase locked to the input frames. *Rate Matched* means that the output runs at close to the input frequency , but is not locked to it so the output will drift in phase relative to the output. *Free Run* forces the output to run at a 60Hz frame rate.

Warp Latency. Requires optional Christie TWIST module. See *Christie TWIST* User's Manual provided with the module.

Advanced Image Settings Secondary Menu

Motion Filter. This control is most useful for smoothing out moving images from interlaced sources. In most cases the proper *Motion Filter* setting is automatically determined according to the type of incoming source signal. However, if your source is noisy and/or inconsistent, you may wish to "force" a setting to ensure stable processing for this source. If desired, override the default "Auto" setting by selecting the appropriate motion filter:

1. **Auto:** The projector automatically uses the correct motion filter according to the incoming signal.
2. **Still:** For static images with no motion, such as graphics from a CD.
3. **Motion**: For video images that did not originate from film, or for moving computer-generated images.
4. **Film**: For video images that originated from film. This will optimize image quality and stability.

Film Mode Threshold. This setting determines how sensitively the projector can detect if an incoming video signal originated from film or not.

Detail Threshold. Use "Detail Threshold" to define at what frequency level the "Detail" control will begin to magnify high frequencies, which adds details back into the image. Raise the threshold to ignore more of these high frequencies, and lower the threshold to magnify more of these frequencies. A setting of "0", for example, means no noise is ignored and all is magnified. An ideal detail threshold is one in which high frequencies that are causing objectionable noise are not magnified when using "Detail", but frequencies which can help sharpen an overly-soft image are magnified when using "Detail".

3.7 Using Inputs and Channels

NOTE: *Refer to Section 2 Installation and Setup, for a full explanation of how to connect sources to the projector.*

The projector stores and automatically recalls up to 99 different channels (source setups) for a variety of inputs. This memory feature allows you to define and conveniently use a wide variety of customized setups rather than having to repeatedly re-configure the projector for different presentations. Depending on what you have defined, each physical source connection (i.e., input source to the projector) can have several different channels associated with it.

3.7.1 Do I Select an Input or a Channel?

An *Input* is a source physically connected to the projector. Inputs 1 to 6 describes the source signal according to which input slot (side panel) it is connected.

Switching to a Different Input Source

There are different ways to change between different Inputs:

- Press the appropriate direct key (Inputs 1 to 6) to quickly display one of the 6 inputs connected at the side of the projector.
- Press INPUT and enter the appropriate number (1 to 6) corresponding to the location of the desired signal (on-screen feedback is provided).
- Alternatively, if the "*Numbers Select Main Image*" option (refer to *3.9, Working with PIP*) is enabled, press numbers 1 to 6 on the built-in keypad or standard IR remote to select the appropriate Input source.

With any of these methods, the image displays according to the following:

If it is the first time you have used the source/input (or if you used the input, but did not define a channel by adjusting anything), the projector recognizes the new input signal based on its frequencies and polarities, and automatically displays an image according to default settings for such a signal. In general, the image from the new source is as large as possible without losing its aspect ratio. This and other default image settings depend on the incoming source.

If you used the source once before and changed a display parameter such as Contrast, V-Position, etc., then a channel is automatically created and still exists in projector memory (see below). Using an INPUT key automatically recalls this channel (along with all associated setup parameters) and updates the display accordingly.

If more than one channel exists for the input, the image displays according to the setup parameters for the first channel with matching characteristics.

If PIP is enabled, press INPUT + n to change the PIP (secondary) image source, and INPUT + PIP + n changes the main (primary) image source.

NOTE: *Inputs 7 and 8 require the **Dual SD/HD-SDI** module in either of the projector's option slots. For their selection, refer to Section 3.2 Using the Built-In Keypad or Remotes.*

A **Channel** is a collection of measurements, locations and settings that tailor the display of a signal to your specific needs. Since source types and applications can vary greatly, you likely want to adjust and define a wide variety of parameters, such as brightness, contrast, size, etc., in order to customize and optimize the display from or for a particular source. For example, the display settings you choose for a VCR source may be very different from those you choose for a high resolution computer source, or one signal may simply vary from another signal used previously through the same input location. Once you have adjusted a display parameter, such as pixel tracking or contrast, all current settings are collectively stored in the projector's memory as a unique 2-digit **Channel**, such as "09".

You can have numerous distinct channels available for the same input, any of which can be selected by using the CHAN key on the remote, followed by the 2-digit channel number.

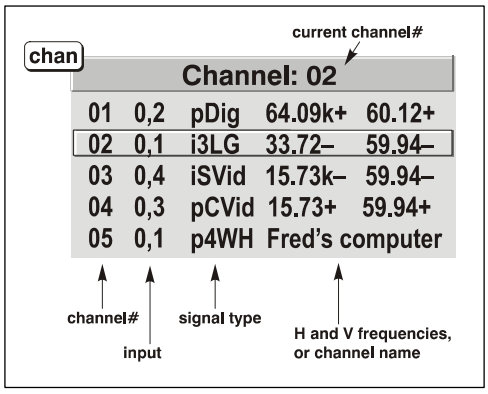


Figure 3-19 Channel List

Shown above is a sample list of channels available when you press the CHAN key. This is typically called the "*Channel list*".

NOTE: *The* CHAN *key may display a channel list or not, depending on what you have defined for "Display Channel List" (refer to Menu Preferences later in this section).*

In order to access channels by using the CHAN key on the remote, you must first create the channels. See below.

3.7.2 Creating a New Channel

To use a new input source with the projector, a new channel must be added to the projector memory so that the projector responds properly to an input signal from that source in the future. A new channel can be created automatically, as described here, or it can be copied from an existing channel, and then edited as necessary (see *Section 3.7.5 Copying a Channel* later in this section).

When you select a direct input (**Input 1**, **Input 2**, **Input 3**, **Input 4**, **Input 5**, or **Input 6**), any existing channels in the projector are searched for matching input and signal parameters. If no match to the incoming input signal is found in currently-defined channels, a new channel is temporarily created based on factory-defined defaults for this type of signal. The channel number assigned is the lowest available number from 01-99.

NOTES: 1) *An automatic channel is discarded unless one or more of its parameters are changed, and it does not appear in the channel list (see below).* **2)** *If two channels have the same distinguishing source characteristics except for the reversal of sync connectors (i.e., H-sync and V-sync, are switched), they are still defined as distinct channels.* **3)** *You cannot define a new channel without an incoming signal.*

If the incoming signal does match an existing channel, the image is set up and displays as usual, according to the parameters currently defined for that channel.

3.7.3 Selecting a Channel

Using a Channel

You can normally select a channel at any time by pressing CHAN. If you want to prevent a channel from appearing in this list, you must edit the channel as described in *Section 3.7.7 Editing a Channel Setup* later in this section. Such a channel can still be selected by entering its number as shown below.

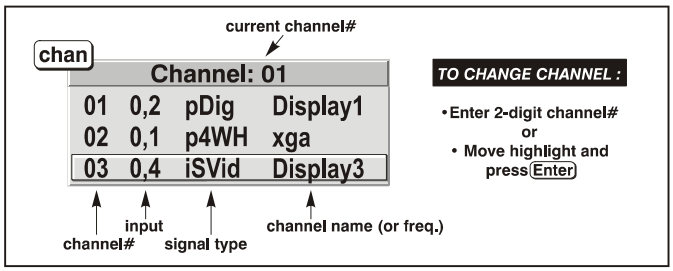


Figure 3-20 Selecting a Channel

NOTES: 1) *The current channel is highlighted upon entering the channel list, or, if this channel is not displayed here, the first channel in the list is highlighted.* **2)** *Channels created automatically do not appear in the channel list unless a parameter for the channel has been changed.*

3.7.4 Available Channels in the Channel Setup Menu

All available channels are listed in the *Channel Setup* menu, which describes how each channel can be accessed and which serves as the gateway for editing, copying, and deleting channels.

From the presentation level, press MENU to display the *Main* menu. To display the *Channel Setup* menu, highlight the *Channel Setup* option, and press ENTER. The *Channel Setup* menu appears (see below) with the active channel highlighted.

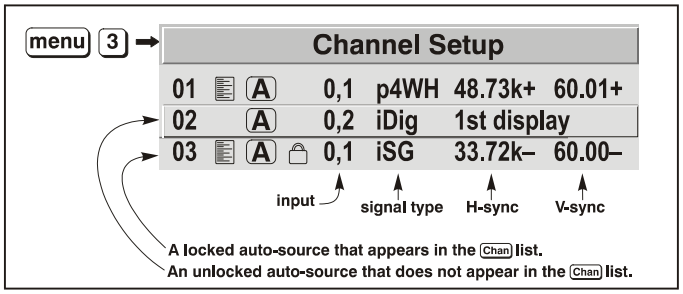


Figure 3-21 All Channels Appear in Channel Setup Menu

What Appears in the Channel Setup Menu?

This menu lists all channels currently defined and indicates where they connect on the projector's side input panel. The far left column lists channel numbers currently defined. The values in the far right columns indicate horizontal and vertical frequencies or if someone has defined a name for this channel, it appears here instead. Remaining columns contain details pertaining to each channel setup, such as the switcher number (always 0 = projector), slot location (01-06; 7 + 8 with optional SDH), a variety of icons indicating access to each channel, and an abbreviated description of each signal type. Refer to *Section 3.7.7 Editing a Channel Setup* for details.

NOTE: *If you have more than a handful of channels, use the* LEFT *and* RIGHT *Arrow keys to see the remaining channels not visible in the initial display of channels.*

Signal Types

Either Channel list, whether the CHAN key list or the *Channel Setup* menu, identifies signal types in a shortened form as defined below. These description codes indicate what signal information the projector uses to identify a match for a given channel, and are preceded by either an "i" (interlaced signals) or "p" (progressive signal"). Refer to *Figure 3-21*.

Table 3.5 Abbreviations for Signal Type

Codes	Signal Type
4WH	Composite (4 wire) on HC input
4WV	Composite (4 wire) on V input
SG	Sync-on-green
5W	Separate H,V
5WR	Separate H,V swapped
SVid	S-Vid
CVid	Composite Video
Dig	Digital

Functions within the Channel Setup Menu

To copy, delete or edit a channel, highlight the desired channel in the *Channel Setup* menu and do one of two things:

- Press FUNC if you want to copy the selected channel or delete one or more channels. See *Section 3.7.5 Copying a Channel* or refer to *Section 3.7.6 Deleting One or More Channels*.
- Press ENTER if you want to edit a channel's setup (i.e., non-image related parameters) for the selected channel. Refer to *Section 3.7.7 Editing a Channel Setup*.

3.7.5 Copying a Channel

Making a copy of a channel is a quick way to duplicate a channel that contains most of the settings you need without creating a new one from scratch. This then allows you to adjust the settings specific to the new presentation required.

To make a **Copy** of an existing channel, highlight the desired channel in the *Channel Setup* menu, and press FUNC to open the *Channel Copy/Delete* secondary menu. Select "*Copy*" and press ENTER to create a new channel. It is identified with the next available channel number (01-99). The new channel is identical to the original channel, but it is identified with the next available number from 01-99. If you change your mind and do not want to copy the current channel, press EXIT to cancel and return to the previous menu.

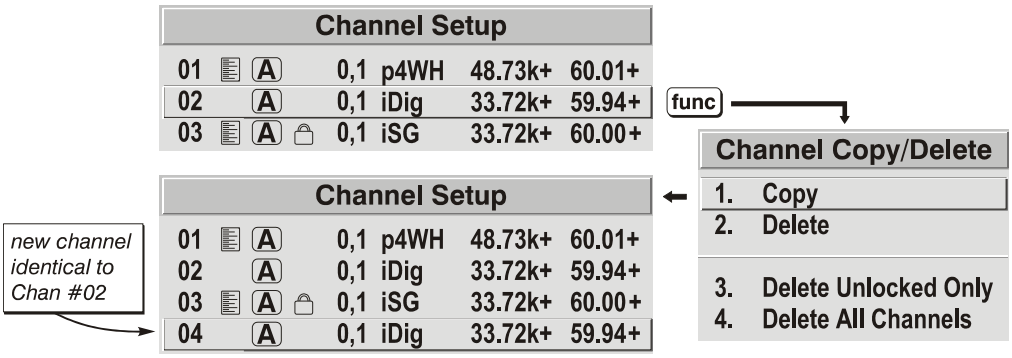


Figure 3-22 Copying A Channel

3.7.6 Deleting One or More Channels

To **Delete** an existing channel, highlight the desired channel in the *Channel Setup* menu, and press FUNC to open the *Channel Copy/Delete* secondary menu. Select "*Delete*" and press ENTER. A confirmation window appears asking that you really want to delete this channel. The *Delete Channel Setup* option is the default. You may chose to *Cancel* the deletion as well.

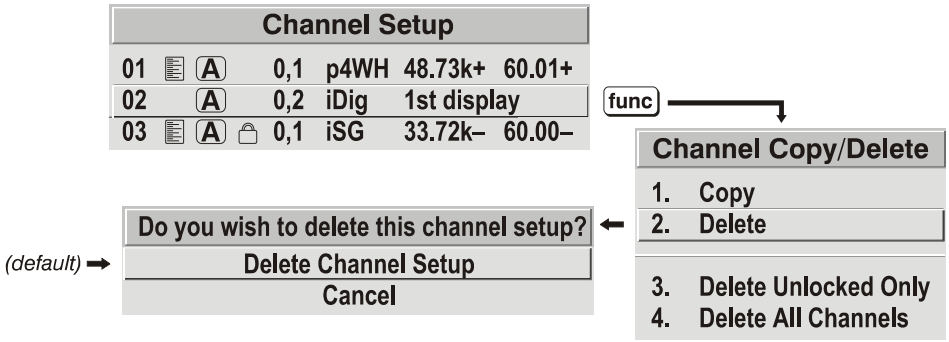


Figure 3-23 Deleting a Channel

To **Delete** multiple channels**,** highlight the channel you wish to delete in the *Channel Setup* menu, and press to open the *Channel Copy/Delete* secondary menu. Select "*Delete Unlocked Only*" and press ENTER to delete all unlocked channels.

To **Delete** all channels from the *Channel Setup* menu, select "*Delete All Channels*" from the *Channel Copy/Delete* secondary menu, and press ENTER. This performs a deletion of all channels, including those that are locked.

NOTE: *Once deleted, the current (highlighted) channel remains, but is redefined with the projector's default settings.*

To **Delete** only those channels which are unlocked, select "*Delete Unlocked Only*" from the *Channel Copy/Delete* secondary menu. This deletes only those channels that are unlocked. All locked channels remain in the *Channel Setup* menu.

NOTE: *For any deletion, a confirmation box appears to ensure that you really want to delete the channel(s). Select "Cancel" (default) if you don't want to delete after all.*

3.7.7 Editing a Channel Setup

The basic setups that describe how and where a channel can be accessed are listed in the *Channel Setup* menu. These channel setups can be edited at any time in the *Channel Edit* secondary menu.

1. From the presentation level, press MENU to display the main menu.
2. Press "3", or move the highlight to the *Channel Setup* option, and press ENTER. The *Channel Setup* menu appears.
3. To edit parameters for an available channel in the *Channel Setup* menu, select the channel whose parameters you wish to change, and press ENTER. The *Channel Edit* menu appears as shown in the sample below in *Figure 3-24*.

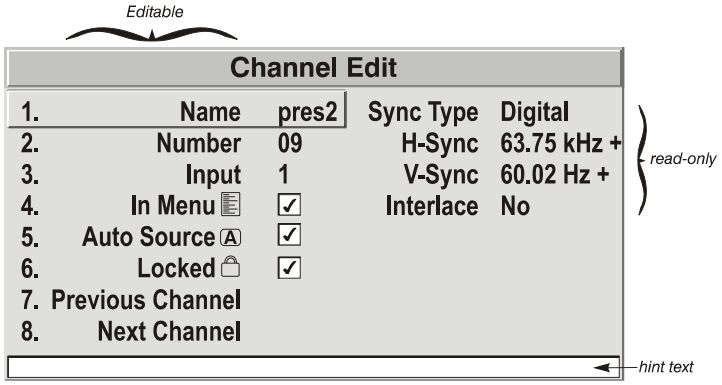


Figure 3-24 Channel Edit Menu (*SAMPLE*)

4. If desired, review and/or edit the selected channel's setup options in the *Channel Edit* menu:

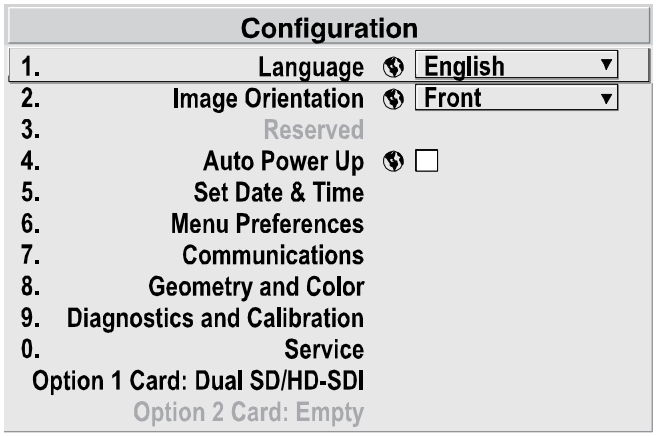
Channel Option	Description	Notes
Name	An alpha-numeric label assigned to the current channel which can be defined and/or changed as desired. Channel names can be upto 12 characters in length.	1) If you enter a channel number that already exists, a dialog message appears indicating that this number is already in use. Assign a different channel number. 2) You can define up to 99 channels
Number	A 2-digit channel number.	
Input	Enter a numeric value (1 to 8) corresponding to the projector's source input connection's location.	
In Menu	If checked (default, except for automatically defined channels with unchanged parameters), this defined channel then appears in the *Channel Setup* menu. If unchecked, the channel must be accessed via the CHAN key on the remote or via the **Auto Source** function.	On-screen display (OSD) of the channel list is an option that must be set in the Menu Preferences menu.
Auto Source	If checked, (default), the projector can automatically locate this channel when an incoming input signal matches. If not checked, the projector can locate the selected channel only when it is directly selected via the CHAN key on the remote.	A change in input signal does not result in a channel change.

Channel Option	Description	Notes
Locked	If checked, all of the image settings for this channel are disabled (locked). If unchecked (default), all available image settings can be adjusted as desired.	You cannot use **Auto Setup** with a locked channel.
Previous Channel	Select this option to return to the previous channel in the *Channel Setup* list and view or change its *Channel Edit* settings.	
Next Channel	Select this option to move to the next channel in the *Channel Setup* list and view or change its *Channel Edit* settings.	

3.8 Adjusting System Parameters and Advanced Controls

Use the *Configuration* menu to define general operating parameters and communications with other projectors and equipment, and to access other advanced processing and image adjustments affecting overall performance. In addition, the *Configuration* menu provides access to diagnostics, calibration tools and the Service secondary menu (password-protected).

Keep in mind that settings in the *Configuration* menu (and its secondary menus) are typically "global" settings applied regardless of the type of source your are using. This characteristic is identified with the *Globe* icon alongside the option.



NOTE: *The Configuration menu is recommended for experienced users/technicians only.*

3.8.1 System Configuration (General Settings)

The first six “General” options in the *Configuration* menu are explained below:

Language

Choose from available languages to use in the projector's menus. The change takes effect immediately.

Image Orientation

Set the orientation of the image according to the orientation of your projector. If the setting is incorrect, projected images are reversed and/or upside down.

NOTE: *While the projector’s image orientation can be changed, the projector itself cannot be inverted.*

Auto Power-up

Enter a check mark to enable the projector to automatically power up after losing power due to a power failure or due to unplugging the projector during operation.

NOTE: *Unsaved display adjustments may be lost.*

Set Date & Time

Enter/read the current year-month-day and hour-minute-second. Changes here reset the projector's real-time clock.

Menu Preferences

Use the options from the *Menu Preferences* secondary menu to adjust the appearance, content and/or location of on-screen menus and messages.

Large Menu Font

Enter a check mark to enlarge menus and their text. You may have to adjust "Menu Location" to accommodate the increased menu area.

Menu Location

Use the drop-down list to choose a pre-defined default or customized location for the display of all on-screen menus.

To create a custom menu location quickly, choose a preset that is closest to the desired location. Then adjust the slidebars of *Horizontal Shift* and *Vertical Shift* to move the menu to the desired location. To prevent cropping of larger menus, avoid locations too close to a corner or edge.

Horizontal and Vertical Shift

Shift your menus as desired, creating a customized menu location.

Display Channel List

Enter a check mark if you want to see a scrollable channel list whenever you press **CHAN button** from your presentation. Channels marked with a **LIST** icon in the *Channel Setup* menu then appear in the list. The *Display Channel List* option also enables on-screen feedback when using the INPUT key. If you prefer to hide the channel list and input dialog box while switching channels and sources during a presentation, clear the check box.

NOTE: *The Channel List and input dialog box cannot be hidden during use of the menus.*

Display Sliderbars

Enter a check mark to superimpose a small slidebar over the current image whenever an adjustable parameter is selected directly with a key such as CONT or BRIGHT. If "Display slidebars" is unchecked, these slidebars can still be accessed, but will be hidden during adjustment. This option does not affect slidebars in menus.

Display Error Messages

Choose how you want to be notified of errors detected in either the incoming signal or projector. Select "Screen" or "All" (default) to see brief on-screen messages. This is particularly recommended during setup or testing of the projector. Or select "Serial Ports" to receive messages via RS-232 or RS-422 serial communication only. To hide error message displays, such as during shows and presentations, select "OFF" or "Serial Ports".

Splash Screen Setup

Use the Splash Screen to choose when you would like to display a special introductory splash screen image, such as your company logo, graphic or message.

- **Always Off** = A splash screen never appears
- **Always On** = A splash screen is always on behind the current display image, similar to wallpaper.
- **Startup Only** -The splash screen logo appears at projector startup only.
- **Startup and No Signal** - A splash screen appears at startup only if there is no source signal.

To replace the default "Christie logo" splash screen (or other) with one of your own, use the *KoRE Librarian* to download the desired .bmp to the projector. This overwrites the current splash screen content in projector memory.

3.8.2 System Configuration (Communication)

Settings in the *Communications* secondary menu define and control how single or multiple projectors are can link with each other and with a controlling device.

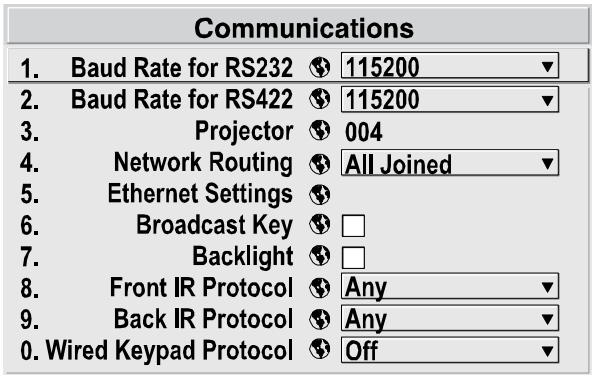


Figure 3-25 Communications

Baud Rates

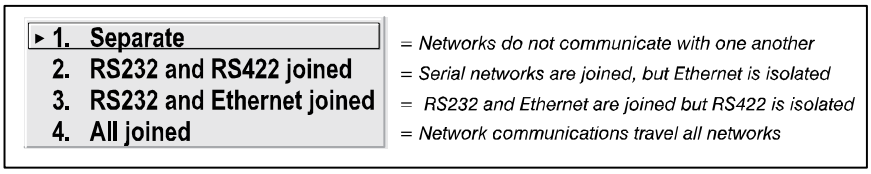
The baud rate setting determines the speed of communication to and from the projector on the RS-232 or RS-422 links. The maximum rate for either standard is 115200. Set the baud rate to match that of your controlling device, such as your PC. If you are unsure about what baud rate to choose, refer to the documentation for the controlling device. In an existing network of projectors, if you discover that a projector has a different baud rate, make sure to use the drop-down list and select the correct baud rate using the ENTER key. Do not just scroll this control with LEFT or RIGHT Arrow keys. Serial communication is always 8 data bits, no parity.

Projector

Enter a three-digit number (such as "001") to assign or change a number to the projector currently in use. If the current projector already has a number assigned, that number appears here (for example, "004" in , above). Numerical identity for projectors enables you to communicate with a single projector within a multiple-projector application (see also PROJ key in *Section 3.2 Using the Built-In Keypad or Remotes*). If you make a mistake in assigning or changing the projector number, press EXIT to cancel.

Network Routing

Not applicable for stand-alone projectors or simple networks with only one type of controller and linking.



Separate

Select "Separate" (factory default) to keep RS232, RS422, and Ethernet messages on their respective paths instead of being broadcast to other types of ports. This is useful when you have a network in which each projector is connected via *both* its RS-232 and RS-422 serial ports (**Figure 3-26**A)-at each projector, serial communications will stay on the path of origin only, as determined by the type of controller. If a projector or path ever fails, you can use the other path.

In *Figure 3-26 A*, failure to keep the networks separate would likely cause communication errors. In *Figure 3-26 B*, where there is only one link between any two projectors (and the controller), make sure to join the networks.

If you have a simple serial network with only one type of linking (RS-232 or RS-422) the type of network routing does not matter.

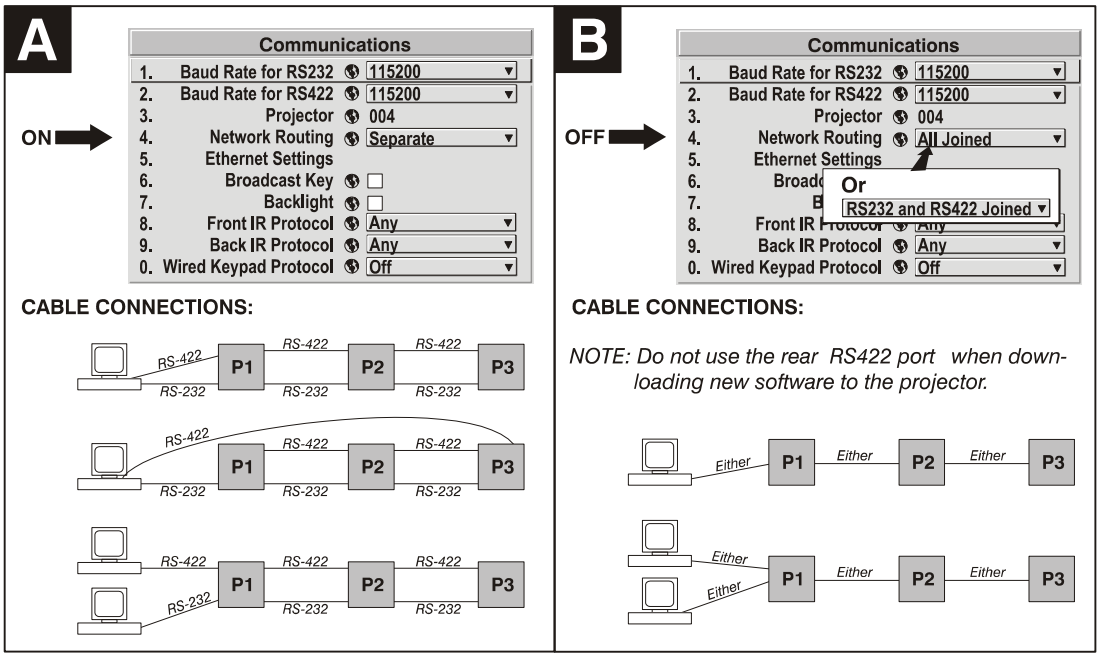


Figure 3-26 Using the "Network Routing" Option

RS232 and RS422 Joined. Messages to and from any serial port is also relayed to all other serial ports. Use when there is only one physical link between any two projectors, but which might be RS-232 *or* RS-422.

RS232 and Ethernet Joined. Messages to and from the RS-232 ports are also relayed to the Ethernet port, and vice versa. Any RS-422 communications are isolated.

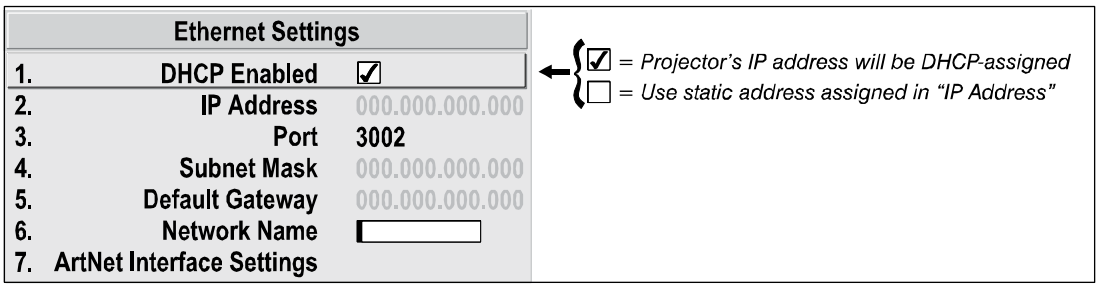
All Joined. All messages reach all ports, regardless of type.

Ethernet Settings Secondary Menu

NOTES: 1) *Not used for stand-alone projectors.* **2)** *Recommended for network administrators only.*

DHCP. Select this check box if you want a DHCP server to automatically change the projector's default IP address (0.0.0.0) to one that is valid and unique for use on the current Ethernet network.

On networks without a DHCP server, or to simply override the automatic DHCP server function, clear the check box, and enter the new "IP Address" settings desired. Remember that only a 0.0.0.0 address triggers the DHCP addressing service only when the DHCP check box is enabled.



IP Address. Enter a valid and unique IP address for use on the network to which the projector is currently connected. Upon the next power-up, this address will overwrite any previous IP address such as the projector's factory-defined default (0.0.0.0), or one that has been assigned by a DHCP server or other user. An IP address entered here remains in effect until it is changed again.

NOTE: *Make sure the projector is connected to the network before changing its IP address. Make sure to re-boot.*

Port. On some Ethernet networks, firewall restrictions may require that the port number of the projector be changed from its default of 3002. If so, enter a new valid port number here. . It is highly recommended not to use a port# below 1024, as these ports are typically reserved by common IP applications.

Subnet Mask and Default Gateway. The Subnet Mask and Default Gateway are automatically assigned when DHCP is enabled. If a static IP is being used, the IP must be assigned first since the subnet mask is estimated by the projector after the IP is entered. The Default Gateway is an optional router device used to send and receive data outside the subnet.

ArtNet Interface Settings Secondary Menu

ArtNet is an Ethernet communication protocol that was developed by Artistic Licence. It is used for controlling lighting/staging equipment from a lighting console or PC application. It is based on the popular DMX512 control protocol.

ArtNet Subnet. This is the highest level address for a device. Typically it is set to 0.

ArtNet Universe. Each packet of data is broadcasted to all devices plugged into a universe (up to 512 devices/ channels).

ArtNet Channel. There are 512 channels per universe. This control allows you to specify the starting channel for this projector.

ArtNet Advanced Mode. When this setting is enabled, each projector listens for data on 64 channels starting with the base channel. When *Advanced* mode is not in use, the projector only listens on 10 channels. You can squeeze more devices per universe when the projector uses fewer channels.

NOTE: *The additional 54 functions are not currently implemented and are reserved for future use.*

ArtNet Base Channel. When advanced mode is enabled, the projector listens to data on 64 consecutive channels, or 10 consecutive channels when *Advanced* mode is not enabled. The projector processes requests that come on either 10 or 64 consecutive channels beginning with the 'base channel' defined here. The requests implement the following functions:

DMX Channel	Function	Value	
Base	Shutter	0 – 64 65 – 192 193 – 255	Open No Action Closed
Base + 1	Slider Lock	0 – 254 255	Locked Unlocked *
Base + 2	Input *	1 – 8	Input #
Base + 3	Channel *	1-99	Channel #
Base + 4	Lens – Vertical * †	0 1 – 254 255	Lens Down Stop Lens Up
Base + 5	Lens – Horizontal * †	0 1 – 254 255	Lens Right Stop Lens Left

DMX Channel	Function	Value	
Base + 6	Lens – Focus * †	0 1 – 254 255	Negative Focus Stop Positive Focus
Base + 7	Lens – Zoom * †	0 1 – 254 255	Zoom Out Stop Zoom In
Base + 8	Power *	0 1 – 254 255	Power Off No Action Power On
Base + 9	None		

* Functions are only active when the *Slider Lock* is set to **Unlocked**.
† Lens functions have no effect on the Roadie HD+35K.

NOTE: *It is important to make sure the channels DO NOT overlap another device.*

Example:

Good	Bad
Proj1_Base = 0	Proj1_Base = 5
Proj2_Base = 10	Proj2_Base = 9
Proj3_Base = 20	Proj3_Base = 11

Device Name. This option is used to name each device. Some ArtNet servers support querying for devices.

Device Description. More information that is returned when a "device query" has been done.

Broadcast Key

Select the check box if you want remote/keypad commands sent to one projector to be relayed to all projectors in a serial network. Note that the PROJ key temporarily "overrides" the effect of a broadcast setting and allow you to control a specific projector when necessary. Make sure to clear the Broadcast Key check box when operating redundant networks.

Backlight

Toggle the built-in keypad lighting ON/OFF.

Front IR / Back IR

As described in ***Section 2***, the standard IR remote is capable of sending data to the projector in either one of seven different protocols called **A - G,** depending on its internal jumper settings (default= **A**). Likewise, the front and rear IR sensors on the projector can be set to accept IR data accordingly, responding to one of the **A - G** protocols, all or none. The projector's "**Always**" default is adequate for most single-projector installations. Select a specific protocol to work with only certain projectors in a multi-projector group.

Note that the front and rear IR sensors cannot respond to *different* protocols-changing a protocol for either sensor to anything other than OFF changes the protocol for the other sensor too. For example, setting *Front IR* to **E** also changes the *Back IR* to **E**. If you want only one sensor to respond to a particular protocol, you must disable the other sensor by setting its protocol to OFF.

To disable *both* IR sensors, you cannot use the IR remote to select the second OFF setting. This safeguard prevents accidentally disabling a remote while you are using it. Instead, use either the built-in keypad or the wired remote (optional) to set the remaining active sensor to OFF. The projector no longer responds to an IR remote.

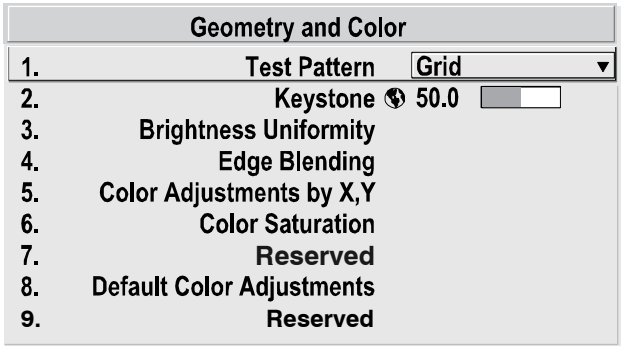
NOTE: *The standard IR remote for this projector is set at manufacture to "Protocol A". Refer to Section 2.14 IR Remote Protocols and Adjustment for information about changing the remote protocol for use with supporting software.*

Wired Keypad

Select "On" to enable use of a wired remote connected to either the rear of the projector (standard IR remote with XLR connector) or the side input panel (optional Lite remote with phono-jack connector). The projector will then respond to incoming commands from either port. To disable the wired remote, you must use a different either the built-in keypad or another IR remote to select "OFF". This safeguard prevents you from accidentally disabling the wired remote during use.

3.8.3 System Configuration (Geometry & Color)

In the *Configuration* menu, select the *Geometry and Color* secondary menu when you need to modify overall color performance and/or image geometry for all sources.



* ***Keystone and Warping*** *if ChristieTWIST warping module is present (standard in Matrix models, optional in all others).*

Test Pattern

Choose the desired internal test pattern, or select ***OFF*** to turn a test pattern OFF. Alternatively, use the TEST key for cycling through test patterns.

Keystone

NOTE: *If the optional Christie TWIST module is installed, this option is Keystone and Warping, and activates a secondary menu for defining custom image shapes. Please refer to documentation included with your Christie TWIST module.*

Use to correct a keystoned image shape in which both sides of your image are inclined toward the top or bottom edge. Keystone is typically caused by tilting the projector in relation to the screen, so that the lens surface and screen are no longer parallel to each other.

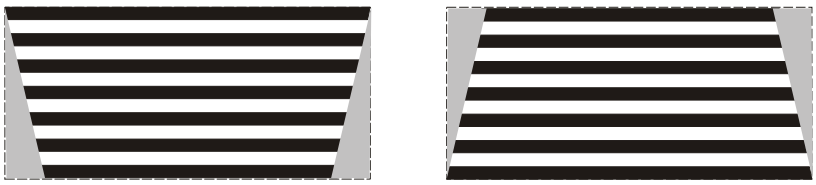


Figure 3-27 Keystone Adjustment

Brightness Uniformity Secondary Menu

Brightness Uniformity provides further refinement of displays already matched for their primary colors and overall light output. Use **Brightness Uniformity** option to create an exceptionally smooth image in which no area appears brighter and/or more red, green or blue than another. In the *Brightness Uniformity* menu, select the "Uniformity Enable" check box to access a multitude of adjustments for critical color light output control in specific areas throughout the image. Your settings apply as long as the "Uniformity Enable" check box is enabled and you are using a "User" color temperature defined by the Brightness Uniformity controls. To disable the Brightness Uniformity function, delete the "Uniformity Enable" check mark.

NOTES: 1) *See also Section 3.12 Using Multiple Projectors for the complete step-by-step procedure for achieving uniform brightness in adjacent displays.* **2)** *If the Christie TWIST module is installed, the enable check box changes to a list giving the option to choose from several different uniformity maps. Please refer to documentation included with your Christie TWIST module.*

Edge Blending Secondary Menu

The *Edge Blending* secondary menu provides a range of controls for smoothing together the overlapping bright edges of multiple adjacent projected images to create a single larger "seamless" image. These controls, which primarily affect whitelevels, are typically used in conjunction with mechanical lens blinders (optional), which are installed on the front of the projector and which primarily affect blacklevels. See also *Section 3.12 Using Multiple Projectors*.

Color Adjustments by X/Y and Color Saturation Secondary Menus

NOTES: 1) *For defining or changing a User 1, 2, 3, or 4 color palette or "gamut". Sometimes known as Comprehensive Color Adjustment™.* **2)** *Factory-defined primary color levels, which ensure a specific color performance from projector-to-projector, can be altered in the Service menu only. If you suspect alteration of these defaults, the factory settings can be recovered with selection of "Reset to Factory Defaults?" in the Color Primary Settings secondary menu accessed via the Service menu (password-protected).*

From the factory, the projector can utilize any of the 3 pre-defined color performance settings identified at right (default=Max Drives), or colors can be driven on the basis of color temperature. For most applications, one of these options will produce accurate and realistic colors from a variety of sources. They can be applied at any time in the *Advanced Image Settings* menu ("**Select Color Adjustment**"), and are not adjustable.

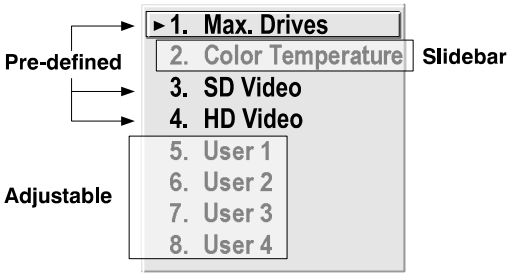


Figure 3-28 Color Performance Choices

Defining User Color Gamuts

In some cases, you may find that none of the pre-defined "*Select Color Adjustment*" options exactly suit your needs. For example, you may require a unique color range or gamut for a single projector or application, or you may need to precisely match colors across multiple adjacent displays. In such cases, use the *Color Adjustments by X,Y* or *Color Saturation* secondary menus to define the precise hue of each primary color component (red, green, blue, and white) used to generate the millions of colors produced in displays. You can create up to four custom color gamuts (User 1, 2, 3, or 4) with these adjustments.

NOTE: *The two menus differ only in their user interface, so use whichever menu best suits your needs and application.*

- *Color Adjustments by X,Y* - Enter known x/y coordinates from the chromaticity graph.
- *Color Saturation* - Adjust color slidebars and judge image color by eye or meter.

A user-defined color "adjustment" can be applied for a source by selecting the desired "User" option in the "Select Color Adjustment" list accessed in the *Advanced Image Settings* menu.

Color Adjustment By X,Y Secondary Menu

Use this secondary menu if you want to alter, add or copy a color gamut (i.e., "color adjustment"). Controls in this menu define the precise hue of each primary color component (red, green, blue, and white) used to generate the millions of colors produced in displays.

The x/y coordinates for each color define its location on the standard CIE chromaticity graph (refer to *Figure 3-29*). Changing either or both of these numbers changes the hue of the color, and relocates the "triangle" for possible colors. For example, changing the x/y coordinates for red will either move the color closer to orange or closer to violet, which in turn affects all displayed colors having a red component. Adjust the slidebars or enter new specific coordinates as desired to define or change up to four "User" color gamuts needed for your environment and applications. Apply at any time in the *Advanced Image Settings* menu.

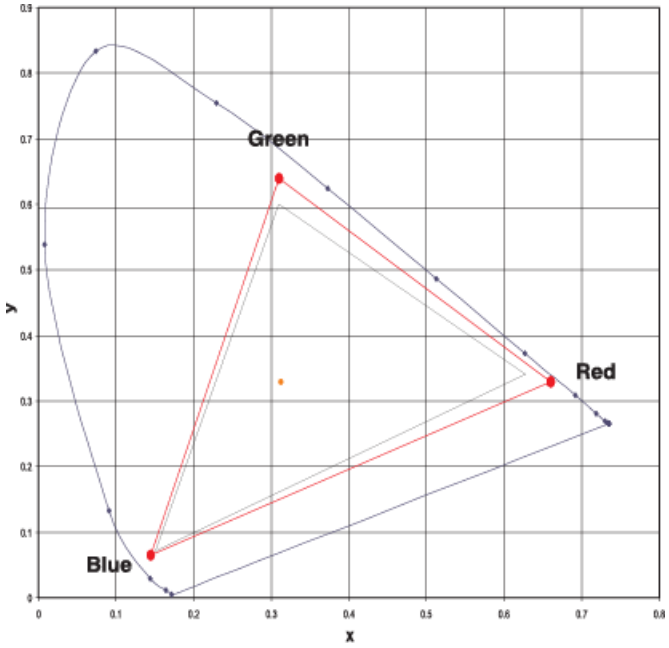


Figure 3-29 CIE 1931 Chromaticity Diagram

NOTE: *Keep new x,y coordinates within the original color gamut triangle shown here.*

PROCEDURE FOR X,Y ADJUSTMENTS. Refer to *Section 3.12 Using Multiple Projectors*.

Colour Saturation Secondary Menu

Use the *Colour Saturation* secondary menu if you do not have specific color coordinates in mind and will be simply judging color performance by eye or meter. Like the *Color Adjustment by X,Y* secondary menu, each color control actually defines new x/y coordinates for that color and changes its hue-it is just a different interface.

Adjust the hue of each primary color (red, green, blue, and white) by using more or less of it in relation to the other colors. Apply at any time in the *Advanced Image Settings* menu.

NOTE: *A **Color Saturation** adjustment defines the corresponding x/y coordinates shown in the **Color Adjustments by X,Y** secondary menu. These x/y coordinates remain stable for this "User" gamut until they are changed again via either menu. Values displayed in the **Color Saturation** menu, however, will likely fluctuate as you use the projector, and will be different when you return to this menu at some point in the future. These floating changes do not affect the x/y coordinates or gamut.*

Default Color Adjustments Secondary Menu

Refer to *Section 3.8.3 System Configuration (Geometry & Color)* for description.

Reserved - No function.

3.8.4 System Configuration (Diagnostics / Calibration)

Test Pattern

Choose the desired internal test pattern to display, or select OFF to turn off a test pattern. Alternatively, use the TEST key for cycling through test patterns.

Test Pattern Grey Level

Set the desired level of gray for displaying in the full gray field test pattern.

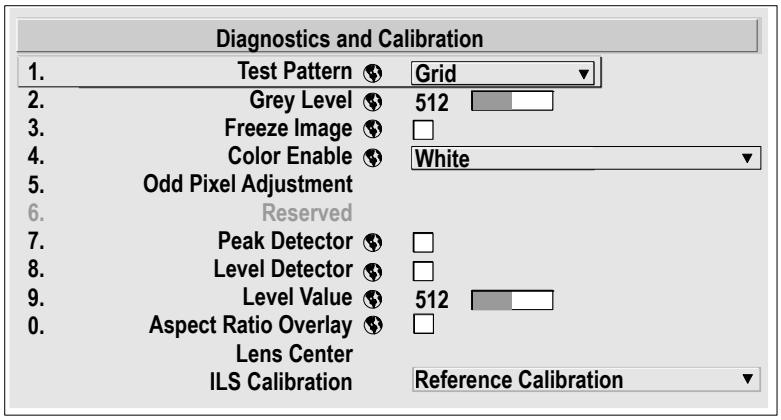


Figure 3-30 Diagnostics and Calibration

Freeze Image

Enter a check mark to freeze (stop) an image at a single frame. This diagnostic tool is useful if you need to examine in detail a still version of an incoming image that cannot be "frozen" at the source. For example, in moving images it is sometimes difficult to observe artifacts such as external deinterlacing/resizing and signal noise. Remove the check mark to return back to normal.

Color Enable

Select which color or colors you want to see. This is useful while working with color temperature, input levels or other special setup parameters. Colors can also be enabled/disabled by entering the corresponding function code listed on the back of the standard IR remote.

Odd Pixel Adjustment

NOTES: 1) *Factory-set and rarely required by user.* **2)** *Source must be >90 MHz.*

When using certain RGB sources, you may need to adjust the normal gain or offset of odd pixels in relation to even pixels. This smooths out very narrow (1-pixel wide) "checks" or vertical stripes that indicate adjacent "on" and "off" pixels. Although Offset and Gain slidebars can be adjusted individually and manually, using the *Level Detector* simplifies this process (see)

1. Use an external analog native-sized continuous grayscale test pattern with at least 256-levels.
2. Turn "Level Detector" **ON**.
3. Set "Level Value" to ***~200***. The image should now be black-and-white (or black-and-one color, if you use "Color Enable" function).
4. Adjust ***offset***. Half of the pixels will move, the other half will not.
5. Adjust until the two transition regions overlap. The stripe of noise will be minimized, defined by the value in the slidebar.
6. Set "Level Value" to ***~800***. The image should now be black-and-white.
7. Repeat Steps 4 and 5, but adjusting gain.
8. Repeat Steps 3-7 for all remaining colors. Your RGB source should now be OK.

Two sets of values are automatically saved with these controls-one value for Input #1, and one for Input #2 (analog). The current set of values depends on which source is in use. This enables a source to be processed correctly via 2 different inputs.

NOTES: 1) *Adjust offset before gain, since offset affects gain.* **2)** *A value of 128 represents no change in normal odd pixel offset or gain.* **3)** *Odd Pixel Adjustment eliminates "1 pixel on, 1 pixel off" patterns only, not any type of larger patterns.*

Reserved

No function.

Peak Detector

The *Peak Detector* is fast method of defining individual input levels, and can improve the accuracy of input levels set by the Auto Input level function. Enabling the Peak Detector activates a special operating mode for detecting only pixels that are considered black or white-all other levels are displayed as a mid-level gray. When used with a 16-step grayscale pattern in which the two black and white bands are known to be at opposite edges of the image, you can watch these isolated areas while adjusting individual blacklevels and input drives until both bands are just visible. Images from this source then display blacks and whites correctly without crushing or washing out.

Level Detector

The *Level Detector* check box enables a specific thresholds for blacks and whites-input levels that fall below a specified Level Value (see below) are displayed as black, and all others are displayed as white. It aids in ***Odd Pixel Adjustment***.

To use:

1. Enable ***Level Detector*** and display a continuous grayscale.
2. Set ***Level Value*** to near black (such as 200).
3. Adjust Offsets to minimize area of black stripe.
4. Set ***Level Value*** to near white (such as 800).
5. Adjust ***Gains*** to minimize area of white stripe.

Level Value

The ***Level Value*** defines the value to be used by the Level Detector in recognizing blacks and whites. See *Level Detector*, above.

Lens Center

Lens Center moves the horizontal and vertical lens offsets to their center position.

Lens Calibration

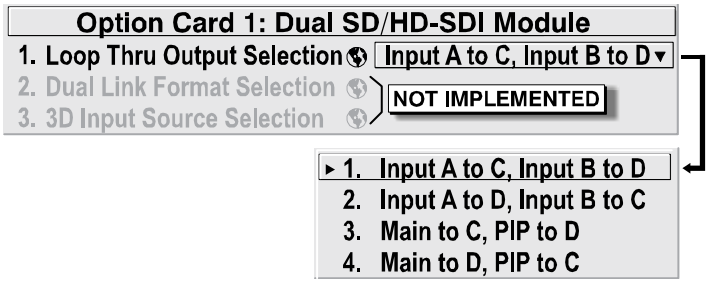
Reference calibration determines a reference point that is used as a defined starting position for relative motion of the lens. All positioning is measured from this reference point.

⚠ CAUTION ***Lens calibration must be performed each time a new lens is inserted or after performing manual lens mount adjustments. This is critical to the projector functioning properly. Failure to do so could result in damage to the lens mount, the projector, or the projection lens.***

To calibrate the lens, select the *Configuration* > *Diagnostics and Calibration* > *ILS Calibration* > *Reference Calibration* option from the *Main* menu. This allows the lens to find the center points of each axis (focus, zoom, horizontal, and vertical), the end stops, and other motion parameters.

3.8.5 System Configuration (Optional Input Modules)

The two "Option Card" entries In the *Configuration* menu identify which optional input modules (a.k.a. cards) are present at **INPUT 5** (Option 1) and **INPUT 6** (Option 2). If either of these option slots are empty, the corresponding read-only menu entry does nothing. If there is a module installed, the corresponding menu entry may activate a secondary menu of further options pertaining to that module.



For example, the *Dual SD/HD-SDI* module is factory-installed at **INPUT 5** (Option 1). The *Option 1 Card* secondary menu provides controls for configuring the various connections on this multi-input, multi-output module. As desired for your application, you can define 1) which physical input loops through to which output, and 2) which functional input (main or PIP signal) loops through to which output.

3.9 Working with PIP

NOTE: *Seamless switching is not currently supported in this projector.*

PIP (Picture-in-Picture) and Seamless Switching are independent , but related projector features that both utilize two image-processing paths within the projector. In the case of Picture-in-Picture, this double processing enables you to display two different images simultaneously - typically a smaller "secondary" image within a large "primary" background. In a seamless switch (not currently available for this projector), the double processing essentially occurs between displays so that a full image relayed from one source can smoothly transform into a full image from another source. This change can be virtually instantaneous, or slowed as desired so that the current image appears to dissolve or "fade" into the new image.

Options for enabling and controlling PIP and Seamless Switching all reside in the same menu. Note, however, that because both features utilize the projector's double processing capability, PIP and Seamless Switching cannot be used together. For example, fading a pair of PIP images into a new display from a different source is not possible.

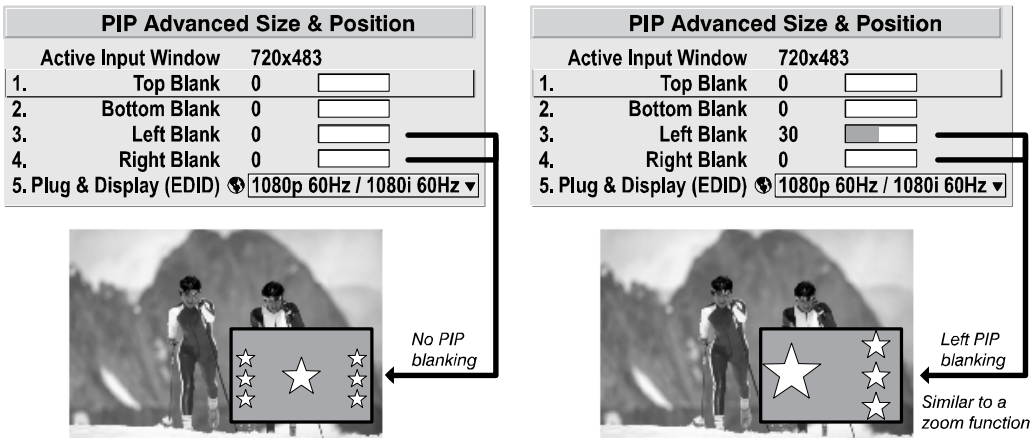


Figure 3-31 Blanking of a PIP Image

For best PIP or Seamless Switching results, use two *different* signal types* as defined below. Do not mix two signals of the same type.

Signal Type	Description (Input Location)
#1	5 BNCs (RGBHV or YPbPr)
#2	DVI - I (analog or digital)
#3	Decoded signals (Input 3, Input 4, Composite video, S-Video, or any video signal via Input 1 BNC connectors or via an analog option card).
#4	Analog Option Cards
#5	Digital Option Cards
#6	Digital Option Cards

* HD interlaced sources are not recommended for the PIP window.

Other PIP or Seamless Switching tips to keep in mind include:

- When using 2 digital signals or 1 analog and 1digital, each must be 165 MHz or less.
- When using two analog signals, each must be 90 MHz or less.
- Avoid using an interlaced source in the PIP window
- Seamless switching may affect image quality in some cases
- Seamless switching is not currently supported in this projector

3.9.1 Controlling Your PIP Image

NOTE: *Controls for the primary image are all accessed through the **Main** menu. To control the secondary (PIP) image, access picture controls through the **PIP and Switching** menu.*

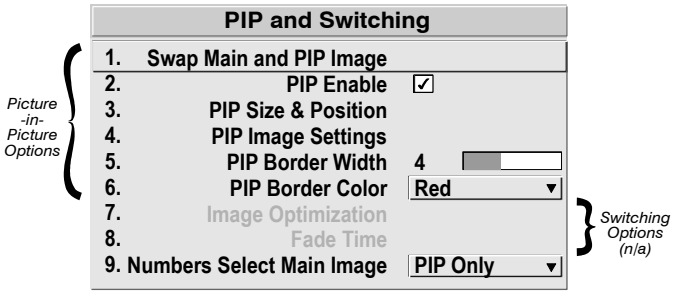


Figure 3-32 PIP Menu
(*SWITCHING is not applicable for the projector*)

Use the first of six (1-6) options in the *PIP and Switching* menu to enable and define how you want to use PIP.

Options 7 and 8 pertain to source switching only, and are not supported in this projector.

Swap Main and PIP Image

Short Cut: Press SWAP from your presentation.

Toggle the current picture-in-picture relationship so that the primary (main) image becomes secondary (PIP), and the secondary image becomes primary. Swapping is available only when PIP is enabled (option 1).

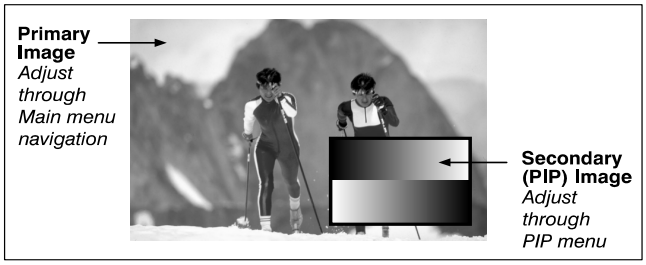
NOTE: *There may be a slight delay when swapping the Primary and Secondary images.*

PIP Enable

***Short Cut*:** Press PIP from your presentation.

Toggle to display from two sources at once (Picture-in-Picture) or the primary source only. This check box turns the secondary source ON and OFF.

NOTE: *Disable PIP for Interlaced sources > 35kHz.*



PIP Size and Position Secondary Menu

Controls in the *PIP Size and Position* menu affect the PIP (secondary) image, functioning in the same manner as the main controls in the *Size and Position* menu. Refer to *Section 3.6.3 Image Settings Menu* for descriptions. Additional options unique to the PIP image are described below.

Position Presets

Set the location of the PIP (secondary) image in the display.

Aspect Ratio Presets

Set the desired aspect ratio of your PIP image to "Default" or "Anamorphic". Refer back to *Section 3.6.3 Image Settings Menu* for details.

Advanced Size and Position

Refer back to *Advanced Size and Position Secondary Menu* for details.

PIP Image Settings Secondary Menu

Adjust the PIP (secondary image) without affecting the size or position. The primary image remains unchanged. Refer to *Section 3.6.3 Image Settings Menu* for details.

PIP Border Width

Set the desired line thickness for your PIP window border.

PIP Border Color

Select the desired color for the PIP window border.

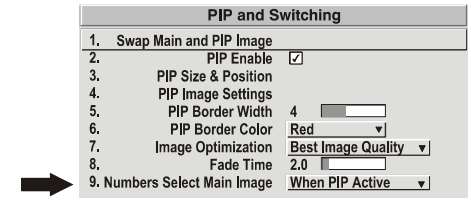
Image Optimization AND Fade Time

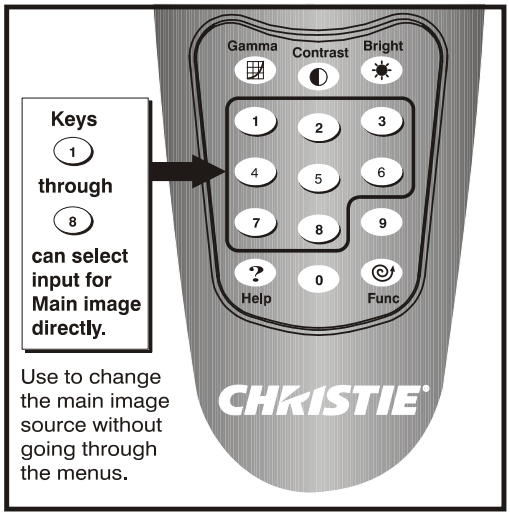
NOTE: *These features are not available in this projector.*

Numbers Select Main Image

Select the **Numbers Select Main Image** option to use the numeric keys #1-8 as Input keys. This remapping of the "lite" remote (refer to *Figure 3-32*) can be particularly useful with PIP displays, providing a convenient shortcut for changing the primary (background) image without first having to return to the *Main* menu. To use the keys in this manner all of the time, even with single displays, select Always. For normal remote function, select **Never** (default). Set to **When PIP Active** to activate number keys as Input keys only when PIP is in use.

NOTE: ***Numbers Select Main Image*** *remote functionality works only when menus are closed.*





3.10 Working with the Lamp

Four different sized lamps can be used with this projector: 2, 3, 4.5 or 6 kW. To ensure that the required ignition and power level is supplied to the lamp, you must define which lamp size is installed before power-up, otherwise the lamp could be seriously overdriven or under driven. Subsequent adjustments in the Lamp menu can then help to optimize lamp performance and ensure the brightest, most uniform image possible for the life of the lamp.

3.10.1 Which Lamp is Installed?

The ideal time to check your lamp size is prior to each power up. This avoids the possibility of igniting your lamp with the wrong level of power:

Refer to *Figure 3-34*. Before powering up the projection head, press MENU. The **LCD STATUS DISPLAY** at the rear of the projector shows a "Lamp Size" of 2000, 3000, 4500 or 6000 watts, depending on its most recent setting (factory default=6000). Select the lamp that is currently installed. If you are unsure, a Christie accredited service technician must unlock the lamp door, and look at the lamp.

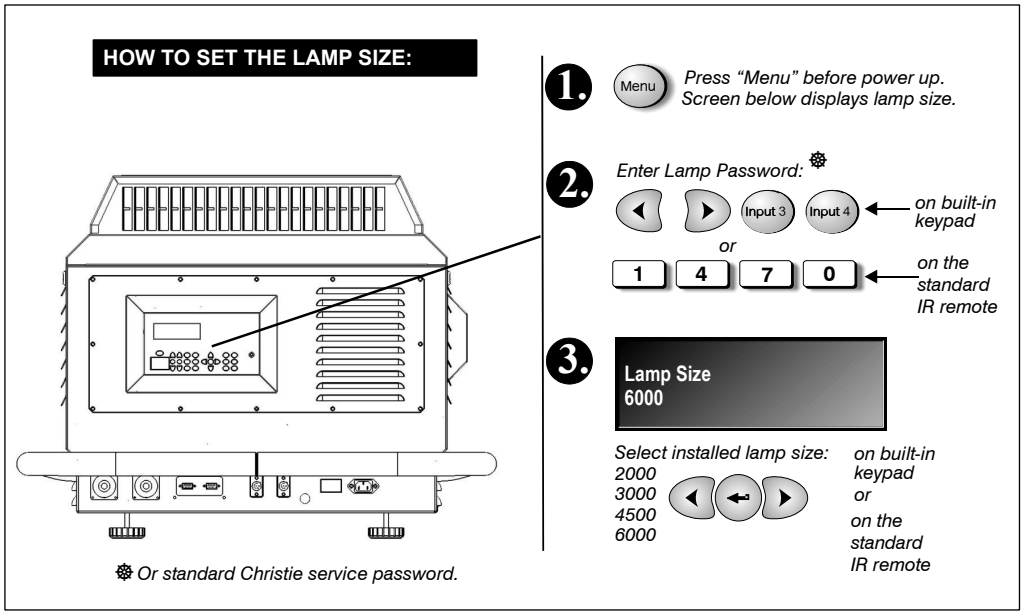


Figure 3-33 Checking/Setting Lamp Size

NOTES: 1) *Setting the lamp size requires a Christie accredited service technician. The required password for access is a service option that may be turned off.* **2)** *Current lamp size should also be recorded on the "Lamp Installed" label located on the lamp door-see right. Mark the appropriate lamp size using a small blue dot label (see inside cover of this manual), or mark with a dry-erase pen.*

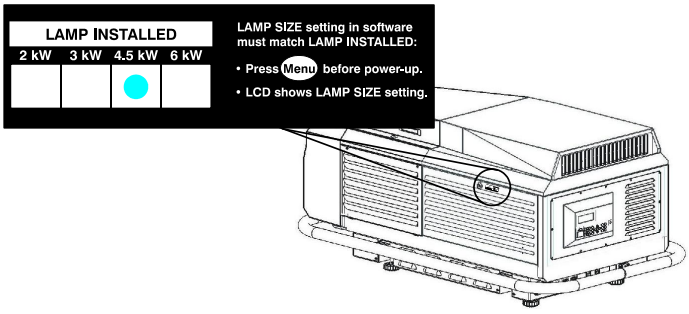


Figure 3-34 Use the "Lamp Installed Label

If the projector is already running, consult the *Status* menu to see which lamp size is currently recorded in projector's memory. If this does not match the installed lamp, you can either change the **Lamp Size** setting in the service password-protected *Service* menu, which implements the new size at the next power-up, or you can power down and press MENU to use the LCD for lamp selection, as described above (passwords are shown in *Figure 3-34*. Always indicate current lamp size on the *Lamp Installed* label.

3.10.2 Lamp Cable Lengths

The high-voltage DC cables connected between the lamp ballast and the rear of the projection head can be 2-30 meters in length, depending on your site requirements and setup. The length currently in use must be defined in projector software for any new installation. This setting compensates for the voltage drop that occurs over distance and ensures that the proper voltage is maintained at the lamp. In the *Lamp* menu, set the "Cable Length (m)" slidebar to match that of your DC cables. By default from the manufacturer, this setting is 8 (approximately 25 feet). See *Figure 3-35*.

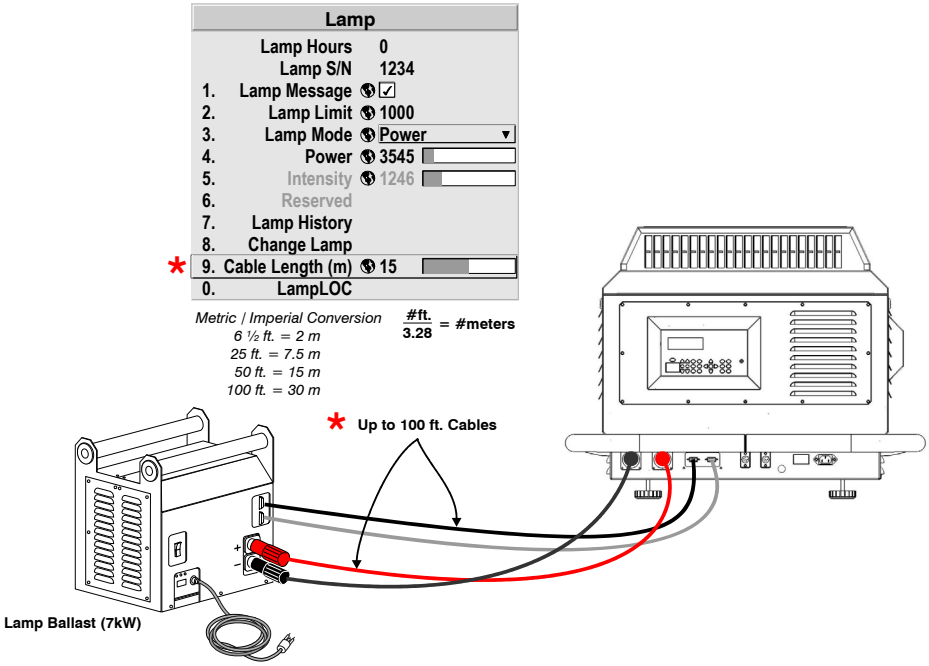


Figure 3-35 Define Lamp Cable Length

3.10.3 Turning the Lamp ON/OFF

NOTE: *Refer to Section 3.2.6 Keypad and Standard IR Remote Functions for more information.*

Lamp ON

1. With the projection head and ballast connected to each other, and the breaker/power switch ON, press MENU. The **LCD Status Display** at the rear of the projector shows a "Lamp Size" of 2000, 3000, 4500 or 6000 watts, depending on its last setting. Factory default=6000. Use LEFT ARROW or RIGHT ARROW to select the lamp that is currently installed. This should also appear on the **Lamp Installed label** located on the lamp door.

NOTE: *A lamp password is required to change lamp type/size, unless the "Enable Password" service option has been turned OFF. Refer to Figure 3-33.*

2. Turn the projection head and lamp ON by pressing the POWER key on either the projector's built-in keypad or standard IR remote.
3. For subsequent power-ups of this lamp, press the POWER key. There is no need to reset the lamp size until a different-sized lamp is installed.

NOTE: *Refer to Section 3.2.6 Keypad and Standard IR Remote Functions for more information.*

Lamp OFF

1. Press the POWER key on either the projector's built-in keypad or standard IR remote.
2. WAIT for fans to continue running for 10 minutes to cool the lamp.
3. Proceed with full shutdown of the system, if desired.

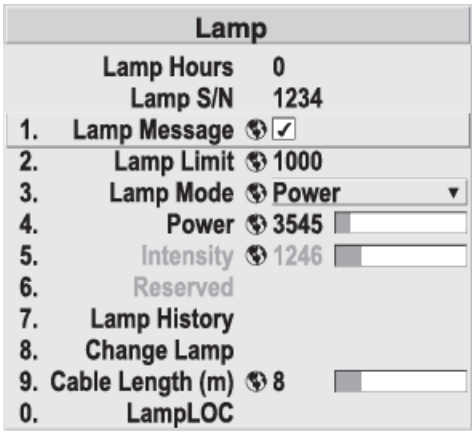
3.10.4 If the Lamp Will Not Turn On

If the lamp fails to ignite, the projector will automatically re-try ignition using 100% of the maximum power acceptable for the lamp. If this re-try also fails, and there is no error code indicating a specific problem such as an open lamp door or an over-temperature condition, the lamp size may be incorrectly defined. For instance, the defined "Lamp Size" may be 2 kW when a 6 kW lamp is present. To check the "Lamp Size" setting, press MENU while the lamp is off. The **LCD STATUS DISPLAY** at the rear of the projector shows a "Lamp Size" of 2000, 3000, 4500 or 6000 watts, depending on its most recent setting (factory default=6000). Enter the password (unless it has been turned off) and select the lamp that is currently installed. If the lamp still does not ignite, a Christie accredited service technician should check all lamp connections and, if OK, replace the lamp.

Refer to *Section 5 Troubleshooting*.

3.10.5 Lamp Menu

Whenever you install a new lamp in the projector, access the *Lamp* menu to record the lamp serial number in the projector's memory. You can also choose a lamp mode for regulating power and Lamp Message check box.



LAMP S/N (read only) option is the serial number recorded for the current lamp. When you install a new lamp and enter its serial number, the number appears here.

Select the **LAMP MESSAGE** check box to enable a warning message that appears upon power-up when the lamp has reached the specified lamp limit and should be replaced. Clear the check mark to prevent display of this message. When your lamp expires, only the status display on the back of the projector provides the visual warning to replace the lamp. In addition, the LED's next to the built-in keypad flash "LP" when the lamp time has expired.

NOTES: 1) *It is recommended that the Lamp Message check box remain enabled.* **2)** *When a lamp warning message appears, press* EXIT *to temporarily cancel the message. The message will continue to appear each time you power-up until you install a new lamp.*

Set the **LAMP LIMIT** to the number of hours you expect to log on the current lamp before replacing it. This triggers a lamp message on-screen (if enabled). Recommended limits for each of the four lamp sizes are listed in *Table 3.7* later in this section.

NOTES: 1) *If you change modes over the life of a lamp, the lamp limit you originally expected may no longer be possible.* **2)** *Turning the lamp on and off reduces lamp life significantly, as do other factors.* **3)** *It is recommended that Lamp Limit not exceed the warranted lamp life, otherwise a lamp could become dangerously fragile with overuse.*

Set which **LAMP MODE** you want to use in order to control the light output. You can choose to run the lamp as bright as possible (i.e., always using maximum power-this is the default upon power up), or you can power the lamp with a specific wattage appropriate for the installed lamp, or you can set a specific intensity (brightness) to maintain. Although there are exceptions, generally higher light output or higher power settings can shorten lamp life.

Use the lamp mode that best suits your brightness needs. For example, in a tiled application, you may want to precisely match brightness levels between adjacent images. If you always want your images to be as bright as possible, choose **Max Brightness**.

Lamp modes are as described below.

Max Brightness

The lamp always burns as brightly as possible, driven by 110% of the power level rating for the installed lamp. Refer to *Section 6 Specifications*. Keep in mind that the "maximum brightness" for any lamp gradually diminishes with age and images become dimmer over time. Its current brightness output level appears in the "Intensity" option.

NOTE: *Not in lumens.*

Brightness remains close to a specified level for as long as possible. Once you select this option, enter a number representing the intensity level (brightness) you wish to maintain-the projector will automatically adjust power as needed to maintain this intensity as closely as possible. Note that the intensity value is a correlation only and does not represent an actual lumens level.

NOTE: *"Max brightness" mode shortens lamp life. Avoid over-driving a lamp for extended periods.*

Intensity

When the projector is operating in **Max Brightness** mode or at a specific Power level, the lamp brightness, which naturally decreases over time, results in a decrease in image brightness. When operating in "**Intensity**" mode, however, the image brightness remains at the selected intensity. The **Intensity** value and slidebar represents the current brightness of your lamp.

NOTE: *The number shown for "intensity" is not the actual lumen output, but rather a correlated value only-9415 may represent 20,000 lumens, for example.*

To use "**Intensity**" mode to set the level as desired for your application, remembering that higher settings can significantly shorten lamp life. Over time, the projector automatically increase the power supplied to the lamp as needed to maintain the chosen intensity as closely as possible. This mode is known as "Brightness Tracking" or "LiteLOC™".

Since power increases over time in this mode, prevent prolonged over-driving by checking the lamp power readings periodically.

Power

The power supplied to the lamp remains at your specified wattage level. Once you select this option, enter the number of watts representing the power level you wish to maintain. See "**Power**" below.

The **Power** slidebar and number indicates how many watts are applied to the lamp. You can apply anywhere from 75% of the maximum power intended for the installed lamp up to an "over-drive" that exceeds the maximum rating by approximately 10%. Set for the number of watts as desired, keeping in mind that lower power levels produce dimmer images.

When in either "**Power**" or **Max Brightness** modes, the power level remains constant. Specifying a maximum power level here is the same as operating in **Max Brightness** mode, and will shorten lamp life.

NOTE: *Power level can be set only if the lamp is in "Power" mode.*

How Long Can I Maintain Brightness?

Software can maintain your "**Intensity**" setting until the required power exceeds the maximum rating for the lamp (2.0, 3.0, 4.5, or 6.0 kW) by approximately 10%. The lower the setting, the longer it takes to reach this threshold, and the longer you can maintain the desired brightness. Keep in mind that once the lamp power reaches its maximum wattage (see "**Power**", above), this tracking is no longer possible. At this point, the lamp gradually dims as usual, even though your original "**Intensity**" value still appears in the menu. To resume accurate tracking, reduce the intensity setting so that the resulting "**Power**" value is less than its maximum-the lower the intensity, the longer it can be maintained.

For example, a 6000-watt lamp (6.0 kW) can be safely driven at no more than 6600 watts. To produce desired brightness at the screen, a new lamp would likely need less than this maximum rating-perhaps 5120 watts (example only). Over time, however, the lamp requires more and more current in order to generate the desired light, until eventually the lamp wattage reaches its 6600 "overdrive" maximum, and the lamp power automatically levels off. At this point, the tracking function terminates (i.e., the power level stabilizes) and the lamp begins to dim normally. Either reduce your "Intensity" setting or replace the lamp.

Do not lower the "Intensity" so much that the corresponding "Power" value reaches its minimum and the intensity setting is inaccurate, and cannot be maintained. For best results in achieving uniform intensity amongst tiled images, choose an "**Intensity**" setting that enables all lamps to operate at less than the maximum number of watts available in your projector , but high enough to keep the corresponding lamp power above its minimum. See "**Power**", above.

NOTES: 1) *Lamps become more stable over time, thus a specific intensity is more easily maintained as the lamp ages.* **2)** *Intensity can be set only if the lamp is in "Intensity" mode 3) Intensity cannot exceed the output of Max Brightness mode.*

The **Lamp History** option (read-only) lists the number for those lamps most recently installed and recorded in the projector. The **Lamp History** automatically updates whenever you record a new lamp serial number and the new lamp is added to the bottom of the list.

Lamp History	
S/N	Hours
1234	1999
5678	27

Use **Change Lamp** to record the serial number for a newly installed lamp:

In the *Lamp S/N* window, use the number text entry keys to record the new lamp serial number, and press ENTER again to accept the change. Refer to *3.5.5 Using Slidebars and Other Controls, on page 3-18* if you need help entering the number. Once entered, the new lamp serial number is added to the *Lamp History* menu and the **Lamp Hours** timer resets to "0". *Lamp Mode* and *Lamp Limit* remain as they were for the previous lamp, and can be changed at any time.

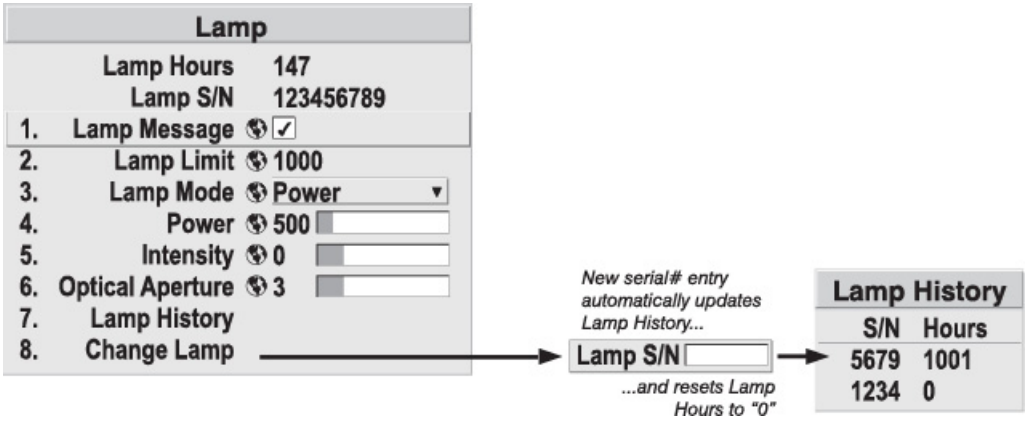


Figure 3-36 Recording the New Lamp Serial Number

NOTE: *Enter a serial number only if you have just installed a new lamp. This helps to ensure that the lamp timer is not reset on an old lamp and that the number of hours logged on the lamp is accurate.*

IMPORTANT! ***Always record*** *the serial number of a NEW lamp***.**

Use the **Cable Length (m)** slidebar to define what lengths of high voltage DC cables are currently connected between the lamp ballast and the "Anode" and "Cathode" ports on the rear of the projection head (refer back to *Figure 3-35*). This regulates the voltage drop that occurs over distance, and ensures that adequate voltage reaches the lamp. Particularly in projectors rented for temporary installations, this setting may have to be changed from its last use. Adjustment range is 2-30m (6½-100 ft.).

IMPORTANT! *Always match this setting to your current cable lengths.*

3.10.6 Adjusting Lamp Position (LampLOC™)

Use **LampLOC™** to align a newly installed lamp after its first power-up. For best results, select the **Do Auto** control in the *LampLOC* menu and wait a few moments for the X-Y-Z values to stabilize. The motors and sensors will work together to precisely position the lamp for optimized performance and brightness at the screen, utilizing filtering to eliminate signs of lamp flicker. Progress status is displayed near the bottom of the menu. When complete, the lamp alignment is optimized for the current installation.

NOTES: 1) *A 10-minute warm-up is recommended before adjusting LampLOC™.* **2)** *Intensity mode (brightness tracking/LiteLOC™) is disabled during a LampLOC™ adjustment.*

Table 3.6 Lamp Current Ranges

Lamp (kW)	Lamp Current Range (amps)
2.0	66-80
3.0	82-110
4.5	112-135
6.0	126-155

NOTE: *Using "Max Brightness" or a maximum Lamp Power setting exceeds the maximum values shown here by approximately 10%. Avoid prolonged use.*

Using the LampLOC™ Slidebars

The individual **LampLOC™** slidebars, each of which moves the lamp along one axis only, are provided incase the **Do Auto** button fails or if you feel a manual, operator-assisted lamp optimization produces more output. Either measure your results with a light meter at the lens and screen, or simply watch the intensity values near the top of the menu. Note, these slidebars you may attain a slightly higher peak than with the **Do Auto** button, but this peak may not be centered on the lamp curve thus lamp performance may not be optimized. The **Do Auto** button also utilizes filtering to eliminate the effects of any lamp flicker. In general, use the individual slidebars if you feel it is unavoidable.

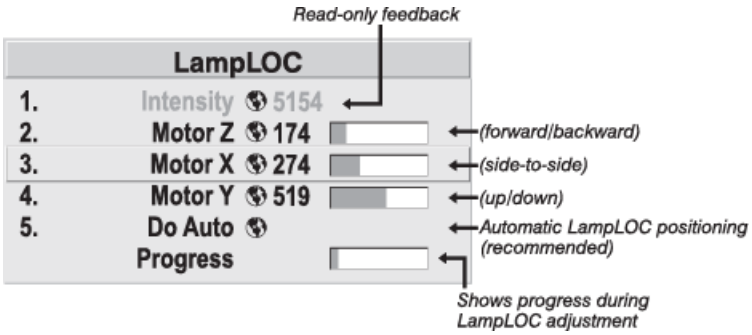


Figure 3-37 Setting LampLOC

How to Adjust (if using a light meter). Obtain peak readings on a light meter at the center of the screen. For each axis, adjust in one direction, and then back up when the reading begins decreasing.

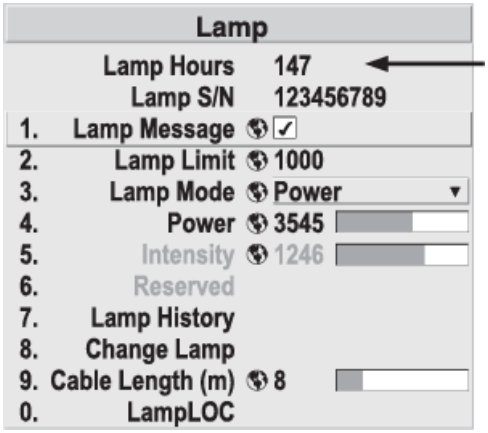
NOTES: 1) *Display a 100% white internal test pattern.* **2)** *Use a tripod to center the light meter with the lens. Distance from the lens does not matter. You may need an attenuator, or wish to construct an internal foil aperture first.* **3)** *This is an optional procedure-watch the intensity feedback shown near the top of the menu if preferred.*

1. Adjust forward/aft (z) until the brightness reading in front of the lens is maximized.
2. Adjust left/right (x) and up/down (y) until the brightness reading in front of the lens is maximized
3. Re-adjust forward/aft (z) as necessary.
4. Repeat Steps 1-3 as necessary.
5. Reset **Lamp Power** or **Intensity**, if desired.

3.10.7 Stand-by Mode

Close the internal SHUTTER to blank the image and put the projector in a cooler stand-by mode with minimum power going to the lamp. Lamp power is reduced to 60% of the maximum rating for 4.5 and 6.0 kW lamps, or 75% of the maximum rating for 2.0 and 3.0 kW lamps. Upon opening the shutter and restoring the image, the lamp power returns to its previous setting.

3.10.8 How Old is My Lamp?



When a new lamp is installed and its serial number recorded by selecting "**Change Lamp**" in the Lamp menu, the lamp timer resets to "0" and begins logging time for the new lamp. This tally appears in both the *Lamp* menu (see right) and the *Status* menu.

To review the number of hours logged for previous lamps, consult the *Lamp History* menu.

3.10.9 When to Replace the Lamp

If the *Lamp Message* check box has been enabled in the *Lamp* menu (recommended), an expiry message appears upon power-up when the lamp has reached its defined **Lamp Limit**. The lamp should be replaced.

The **Lamp Limit** setting should never exceed the lamp's lifetime warranty by more than 20%, as an old lamp becomes increasingly fragile and more prone to sudden failure or even explosion, which can be damaging as well as dangerous. These maximum limits depend on the lamp size. See *Table 3.7*.

Table 3.7 When to Replace the Lamp

Lamp (kW)	Replace BEFORE:
2.0	3000 hours
3.0	2000 hours
4.5	600 hours
6.0	600 hours

3.11 Status Menu

The read-only *Status* menu lists a variety of details about the standard and optional components currently installed in the projector. Refer to the *Status* menu for versions of hardware and software installed, the type (size) of lamp defined in projector memory, its current, voltage and hours logged in total and for a specific period (such as a rental period), and for your projector model name and serial number. In addition, the *Status* menu identifies the current channel, its location, its frequencies and other details.

Scroll the full *Status* menu using the UP ARROW and DOWN ARROW. Use the LEFT ARROW and the RIGHT ARROW for page up/down.

3.12 Using Multiple Projectors

When an installation requires multiple projectors, you can use the RS-232 and/or RS-422 serial ports to daisy chain the units together and control the group with a single keypad, remote or a computer/controller connected to the first projector. In such a network, you can choose to broadcast commands to the entire group, or use the PROJ key as desired to limit responses to an individual projector. Or you may prefer that each projector in an installation stands alone and responds only to a unique transmission protocol from its own remote.

Alternatively, you may want to add projectors to an Ethernet network.

NOTE: *Refer back to Section 3.8 Adjusting System Parameters and Advanced Controls for complete information about communicating with multiple projectors.*

3.12.1 Matching Colors In Multiple Screens

In a multiple-projector wall, you will likely want to precisely match color and intensity from image-to-image so that the full wall is as uniform as possible. This matching is typically done in conjunction with brightness uniformity and edge blending.

Preliminary Calibration

As a final part of the manufacturing process, all primary colors in the projector are precisely set to pre-established values to ensure that overall color performance is optimized and is as accurate as possible (refer back to *Figure 3-18*). Upon installation at a site, however, lighting and other environmental factors may slightly change how these colors appear on your screen. While the change is negligible in most cases, you may prefer to recover the originally intended color performance before trying to match colors from several projectors. Or you may be renting a projector in which the colors were changed for use at its previous site, but are not ideal for yours.

The good first step in achieving such consistency is to use a color meter to measure the native primary colors-red, green, blue, and white-as they appear at the screen and record these as *Color Primary Settings* in the *Service* menu (password-protected) for each projector. On the basis of these new values, which are stored in memory, each projector will then automatically calculate any necessary corrections to reproduce the original factory colors under the current environmental conditions. This essentially calibrates a projector to its surroundings, compensating for factors such as screen type; lamp and/or ambient lighting that can alter the final color characteristics on-screen, and will improve color accuracy and consistency in a group of projectors. It ensures a good starting point for further customizing and matching.

To return to the factory-set color primaries, such as when a projector is moved to different site, you must access the Service menu (password-protected). Select the *Reset to Factory Defaults?* option in the *Color Primaries* secondary menu. Then repeat the calibration process describe above, if desired, and continue with matching of colors.

NOTE: *Using the **Service** menu to set the projector's primary colors as described above is not a requirement for color matching, and is rarely necessary.*

Color Adjustment Procedure

Once the **Color Primary Settings** are calibrated for the site (see above), use the Color Adjustments by X, Y menu to further refine each projector's fundamental primary colors so that the hue and intensity of each color appears the same from one display to another. Once matched, you will have created a single new shared range of colors or "color gamut" that all projectors can produce. This palette-named User 1, 2, 3 or 4-can be applied or disabled for a source at any time throughout a bank of adjacent displays, simplifying both the setup and maintenance of a "seamless" wall.

1. Set up and optimize all projector settings. You can ignore color temperature, since you will be defining a new color palette, but do set up each projector in every other aspect. Closely align all screen edges.
2. Assign projector numbers to make communications easier. Use a wired remote.
3. Use the same lamp mode for all projectors, and do the following:
   - Start **SelectColor Adjustment** to "Max Drives".
   - Display a full white test pattern.
   - Adjust lamp power until white fields appear the same brightness.
4. Display the *Color Adjustments by X, Y* menus for all projectors. Each menu shows the x/y coordinates defining the "Max Drives" color gamut for this projector. Write down the values shown in one (any) of the displays. Refer to *Figure 3-38*. Or use "Copy From" to copy these into a "User" gamut for this projector.

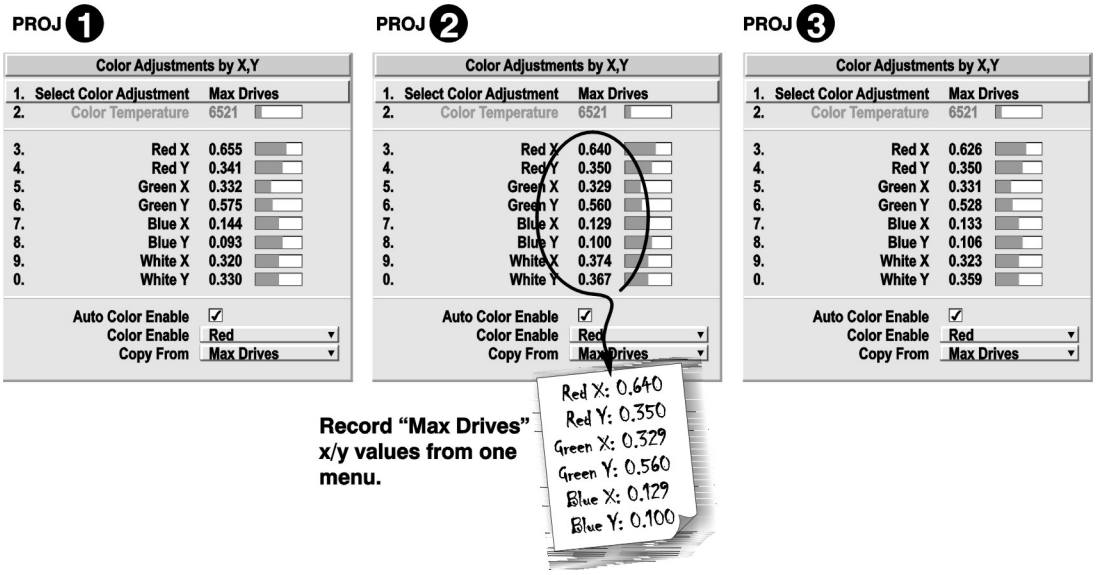


Figure 3-38 Jot Down a Set of "Max Drives" X/Y Values
(**NOTE:** MAGENTA, CYAN, AND YELLOW ARE NO LONGER USED)

5. In each projector, select a "User" color adjustment (1-4) to enable *Color Adjustments by X, Y* changes. Then enter your recorded x/y values into each menu.

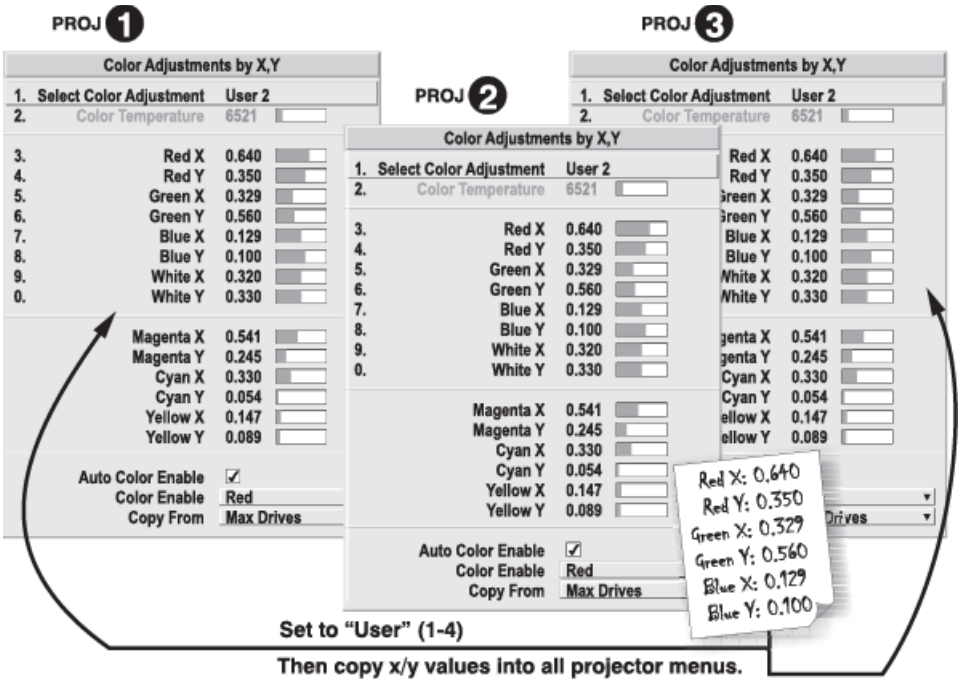
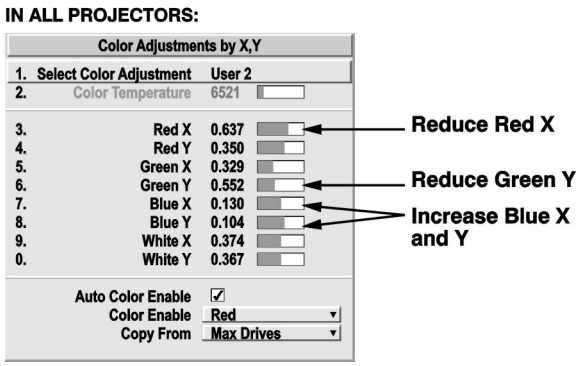


Figure 3-39 Copy X/Y Values into All Projectors

NOTE: MAGENTA, CYAN, AND YELLOW ARE NO LONGER USED.

6. In each projector, judge by eye and adjust x/y coordinates slightly in the following manner:

   - To match reds, decrease " Red X" until full field red screens match.
   - To match greens, decrease "Green Y" until full field green screens match.
   - To match blues, increase both "Blue X" and "Blue Y" until full field blue screens match.



NOTE: *For speed, enable the "Auto Color Enable" check box. Each color coordinate you select automatically triggers a full field display of the corresponding color.*

These coordinate adjustments move the three color points closer together (refer back to the chromaticity chart shown in *Figure 3-18*) to establish a "shared" gamut attainable by all projectors in your group. Adjust only as necessary to ensure the resulting color palette is as large as possible. When done, you may need to adjust lamp power slightly.

7. All screens should now be color-matched. Apply this new "User" gamut to a source at any time by selecting it in the "Select Color Adjustment" list accessed in the *Advanced Image Settings* menu.

Using the Color Saturation Menu for Color Matching

You may prefer to use the *Color Saturation* menu to match colors across multiple screens. In the three *Color Adjustment* secondary menus (Red, Green, Blue-see right), set all main values to "100" and the secondary values to "0". Then judge by eye and adjust the slidebars as needed. Note that adjustments here define new x/y coordinates in the *Color Adjustments by X, Y* menu.

For best results, the *Color Adjustments by X, Y* menu should be used first.

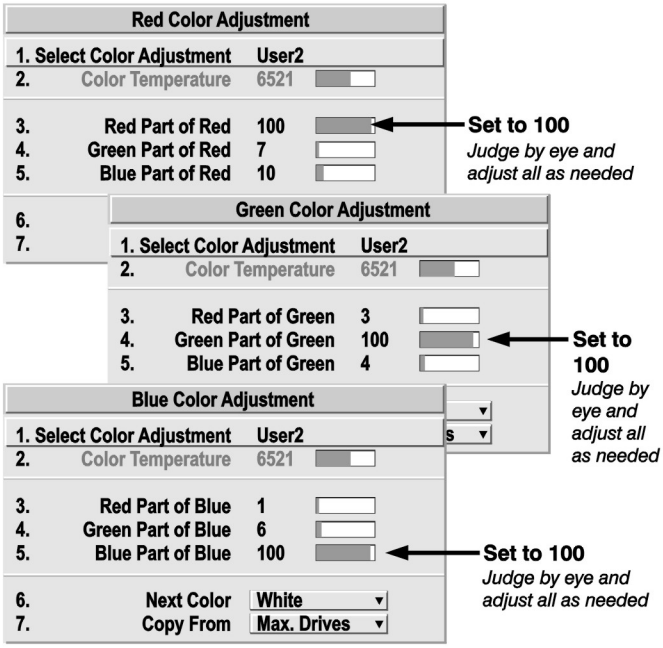


Figure 3-40 Color Matching Using Color Saturation Menu

3.12.2 Achieving Brightness Uniformity

What is Brightness Uniformity?

When used to refine screens already matched for their primary colors (refer to *Section 3.12.1 Matching Colors In Multiple Screens*) and overall light output, proper adjustment of *Brightness Uniformity* can create an exceptionally smooth screen in which:

- No area of the screen appears more red, green or blue than another.
- No area of the screen appears brighter than another color and light output from one screen closely matches adjacent screens.
- Color and light output from one screen closely matches adjacent screens.

Although the *Brightness Uniformity* control can be used for a stand-alone projector, it is particularly useful for setting up and maintaining tiled images that form a cohesive display wall in which the color "cast" and light output appear uniform throughout each image as well as throughout the entire wall. The procedure provided here assumes a multiple-screen application.

Before You Begin

Read through the entire procedure before attempting to adjust **Brightness Uniformity** controls, and keep in mind the following checklist of prerequisites and guidelines:

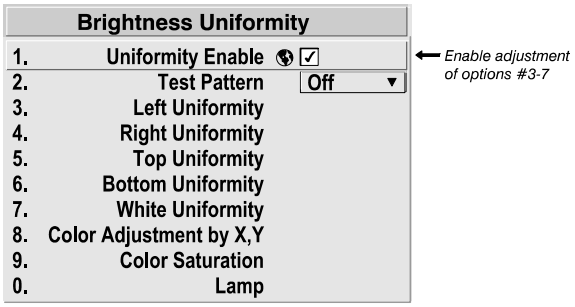
- **Adjust colors first.** Adjust the primary colors as described in the "Matching Colors in Multiple Screens" procedure (above) before attempting to work with **Brightness Uniformity**. This ensures that primary colors, color temperature, and maximized light output are all well matched from one screen to another. These matches are needed before you can achieve good Brightness Uniformity results.
- **Run for 100 hours.** Light output and **Brightness Uniformity** can vary significantly during the first 100 hours of lamp use. For best results with new lamps, either set up Brightness Uniformity after this period, or do an initial setup and re-check at 100 hours.
- **Set lamp power**. Make sure each "**Lamp Power**" setting is as high as possible for your application while still maintaining a good overall match of light output from screen-to-screen. By nature, achieving a uniform brightness will require a slightly reduced overall brightness-this reduction will help ensure that you have enough range of adjustment when examining brightness variables more closely from screen-to-screen, and will help prevent premature "maxing out" when trying to match to a certain color, zone or projector.
- **Use a "User" color temperature**. Always adjust **Brightness Uniformity** for a User color temperature defined when you matched primary colors, and continue to use it for all sources displayed on the wall. Your other color temperatures will not necessarily be matched from screen-to-screen.
- **White Uniformity sliderbars**. **White Uniformity** slidebar values may not always reduce to "0". Each slidebar adjusts overall light output in a specific screen zone, but the value shown represents the current setting for green in this zone. When other "hidden" values (red or blue) are lower than green, during adjustment in the *White Uniformity* menu their values reaches "0" first, causing the slidebar to stop earlier than expected.
- **Judge by eye or use a meter**. Good brightness uniformity can be achieved with either technique.

General Setup

1. Adjust primary colors (refer to *Section 3.12.1 Matching Colors In Multiple Screens*) to ensure matched overall color temperatures and light output between screens.

IMPORTANT! *Double-check that all WHITES and LIGHT OUTPUT are well-matched.*

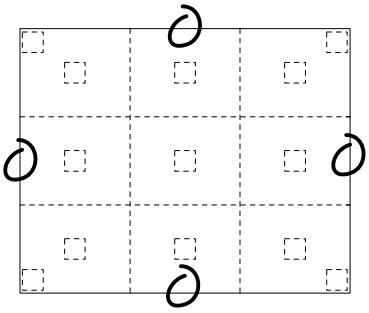
2. Enable the **Uniformity Enable** check box. This enables access to the uniformity controls and applies the settings to your image.



3. Select the 13 Point test pattern for display. This pattern provides 9 screen "zones" with 13 targets.

FOR BEST RESULTS! *Rather than examining the CENTER of each zone when assessing **Brightness Uniformity** adjustments, focus on extreme EDGES as indicated in the illustration shown to the right.*

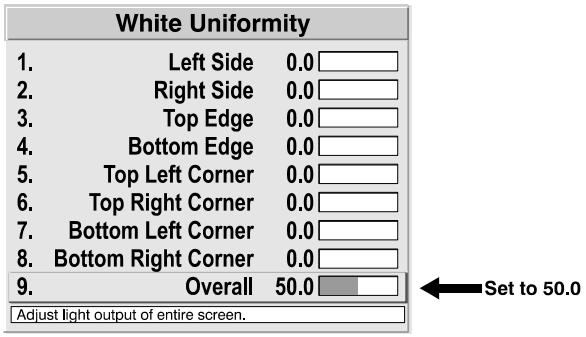
4. In either *Color Adjustment* menu, select a color.



5. Then:
   - If you have created a "User 1" color gamut (recommended) for a well-matched wall, select "User 1" and continue to Step 6.
   - If you prefer maximum brightness rather than a particular color temperature, select "Max Drives".

IMPORTANT! *Do not change User 1 Color Adjustment in color-matched applications!*

6. In the *White Uniformity* menu, set the "Overall" output level to 50.0 and all remaining slidebars to 0.0. This decreases the light output just enough throughout the screen so that any color level can then be increased later as necessary for matching light output from zone-to-zone. Do not exceed **50.0** for "Overall". A higher level will likely interfere with achieving brightness uniformity, and is not recommended.



   Ensure that overall light output remains well matched from one screen center to the next. Where necessary, increase or decrease Lamp Power slightly to recover center matches.

7. Adjust Color (level of red/green/blue) in 8 Zones

NOTE: *At this point, ignore menu colors and the brightness of individual zones.*

8. On each screen, compare the color temperatures in the 8 target zones (4 edges and 4 corners) to that of the color temperature of the center. Compare using a white field only, and take note of any areas that do not match the center. Also decide if any screen exhibits a more obvious color shift than other screens. Begin with this screen in Step 2b.

9. Return to the *Brightness Uniformity* menu. Beginning with the screen that exhibits the most obvious color shift(s), for each edge that exhibits a noticeably different color temperature from the center, select the corresponding *Uniformity* adjustment menu (Left, Right, Top or Bottom). For example, if any part of the left side is too blue, too red or too green, adjust the colors in the *Left Uniformity* menu (i.e., change their light output) until all portions of the left side closely match the center color temperature. Adjust an edge first (focusing on its center), and then adjust its corners.

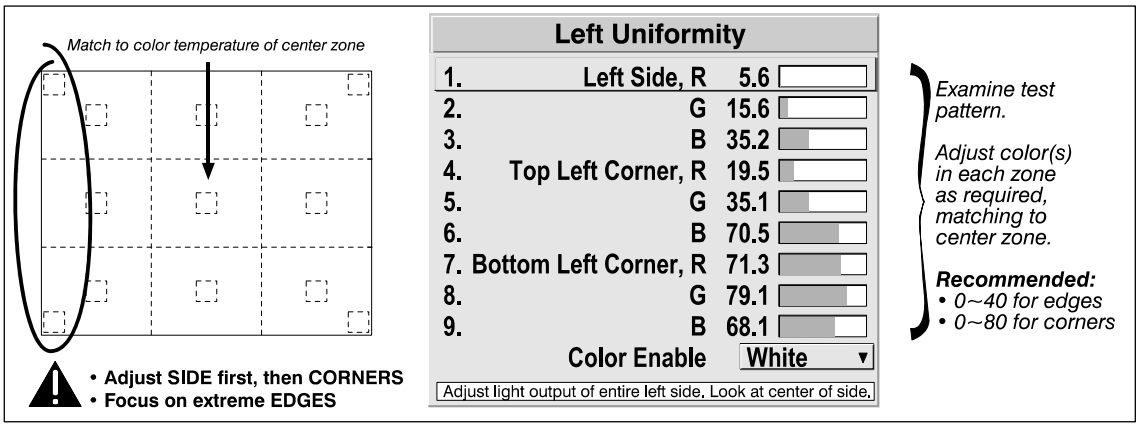


Figure 3-41 Match Zones to Center Color Temperature

10. Repeat the color adjustment of sides and corners for each edge of the screen that does not yet match the center.

NOTE: *Each corner is adjustable in either of its two adjacent "side" menus.*

11. When done, all areas of a given screen should match. Repeat Steps 2a and 2b for all remaining screens.
12. Adjust **LIGHT OUTPUT** in 8 Zones.
    a. For each screen, compare the light output of each edge and corner to that of the center. If any of the areas differ, use the *White Uniformity* menu to match edges and corners to the center as described below (see *Figure 3-36*). Begin with the screen exhibiting the most obvious variations in light output.
       - Adjust edge **White Uniformity** first-note that each edge adjustment also affects the rest of the screen slightly. Keep all edges just slightly lower than the center light output rather than matching light output precisely. Otherwise, it may not be possible to brighten the corners (typically the dimmest areas of the screen) enough. I.e., the best uniformity is a compromise between the brightest and darkest areas of the screen.
       - Adjust corner **White Uniformity** last-each corner adjustment affects only this quadrant.
       - Repeat for each screen.

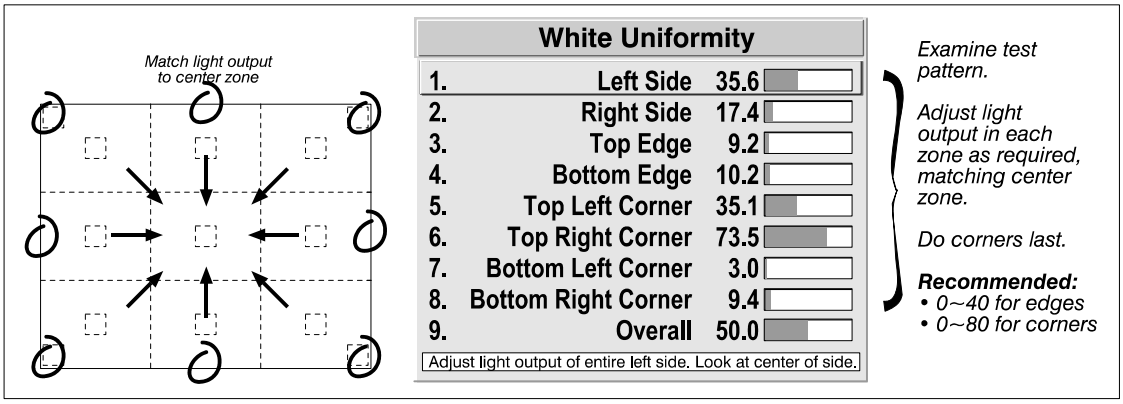


Figure 3-42 Match Zones to Center Light Output

13. Re-adjust Color Temperature (level of red/green/blue) in 8 Zones.
    - Return to Step 7 and, if necessary, fine tune the zones so that they all still exhibit a single color temperature.

Canceling Brightness Uniformity

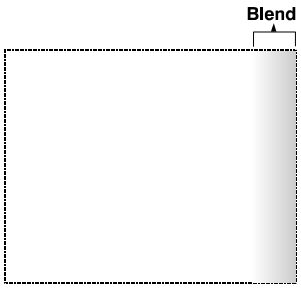
If you do not want to use or apply **Brightness Uniformity** settings, clear the "*Uniformity Enable*" check box at the top of the *Brightness Uniformity* menu.

3.12.3 Edge Blending

Christie Edge Blending is an innovative set of software functions that can quickly and easily blend whitelevels along the edges of multiple adjacent projected images to create a single seamless larger image.

What is a Blend?

In simple terms, a blend appears as a gradient strip along an edge of a projected image. It is darkest along the extreme edge of the image, and lightens nearer to the rest of the image (see right). This area runs along the edge of the projector's internal DMDs (display area); it cannot be located on interior pixels.



How Are Blends Used?

In multiple-projector walls, complementary blends between neighboring images can compensate for the extra "brightness" or intensity where these edges overlap. By controlling blend width and other properties, you can achieve uniformity across the group of images. Visible overlaps disappear as illustrated in *Figure 3-43*.

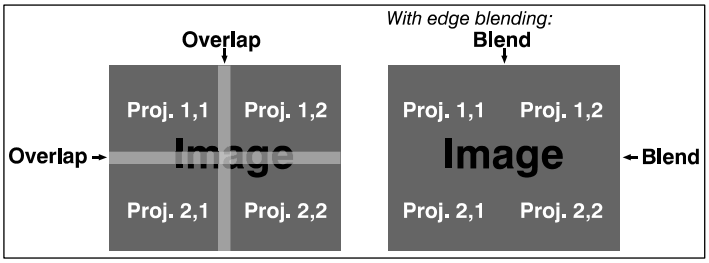
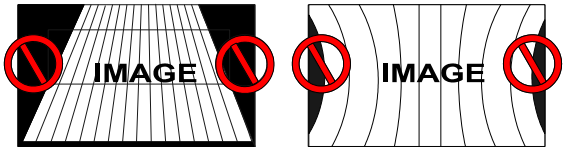


Figure 3-43 Edge Blending Concept

For best results, use the same projector model and type throughout your display wall. In addition, avoid high-gain screens whenever possible. The optical performance of such screens demands minimal image offset, thus projectors must be located very close to one another. It should be noted that the requisite tiling of the image (with data repeated along internal edges that will overlap) must be correctly handled by your source.

Flat Blends vs. Warped Blends

Flat Blend. It is important to remember that the projector's standard edge blending controls affect the outer edges of the projector's display panel, and that each blend is consistent along its length. The standard *Edge Blending* menu controls can blend multiple flat full-panel displays if they have no keystoning or optional warping applied.



Requires Christie TWIST

Warped Blends. When using the optional *Christie TWIST* module for warping images on to curved screens, work with its separate Christie TWIST PC application to create more specialized blends required. Such a blend can vary along its length to compensate for curves. Once downloaded to the projector, simply apply the desired custom "user" blend by selecting it in the **Blending Enable** drop-down list.

Edge blending software controls are located in the 2-page *Edge Blending* secondary menu which you can access via the *Configuration* menu > *Geometry and Color* menu, and select *Edge Blending*. The *More* option opens the second page of the *Edge Blending* secondary menu.

Main Functions

Use edge-blending controls to set the precise width, shape and midpoint you need to blend overlapping edges together smoothly.

- **Blend Width** determines how much area is used for blending along an overlapping edge. Slidebar values represent the number of 8-pixel steps used for the blend. For example, a setting of "3" creates a blended edge 24 pixels wide. A setting of "0" signifies no blending. For best results in most applications, use a blend width of 16-48 steps (128-384 pixels).

RANGES: 0-80 horizontal, 0-60 vertical

- **Blend Shape** determines the rate of roll-off across the blend width, i.e. how quickly the white levels across the blend change from light and dark. Increasing the **Blend Shape** setting accelerates the rate of change at both extremes so that less of the region appears mid-gray (refer to *Figure 3-44*).

- Decreasing the **Blend Shape** setting slows the rate of change so that more of the region appears mid-gray. For most applications, this subtle control is best left close to 50.

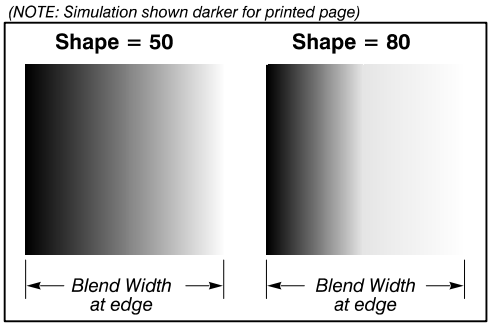


Figure 3-44 "Shape" Examples

- **Blend Midpoint** determines the white level at the blend midpoint (the point equidistant between the beginning and end of the blend). Increasing the **Blend Midpoint** setting creates a blend that appears brighter than the rest of the image. Decreasing the **Blend Midpoint** setting creates a blend that is darker than the rest of the image. A setting of 50 means the midpoint is approximately 50% black-for best results in most applications, keep fairly close to this default.

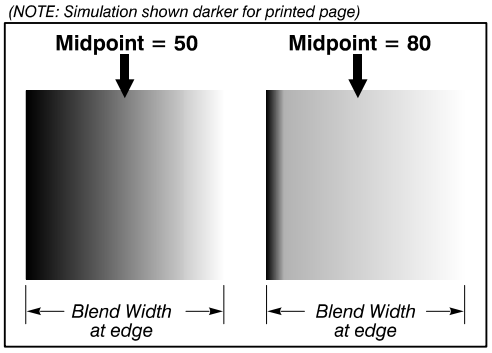


Figure 3-45 "Midpoint" Examples

- Show **Blending Overlap** turns your defined blend width area to solid gray so that two adjacent images can be seamlessly aligned simply by overlapping their gray bars, if needed. Toggle the **Show Blending Overlap** OFF to reactivate the blend effect.

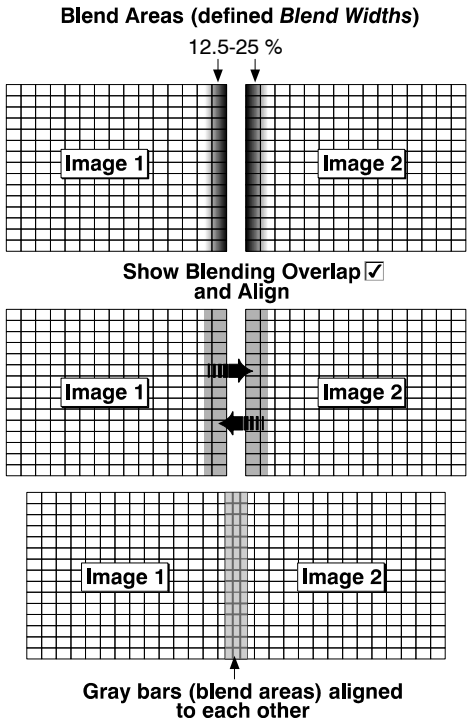


Figure 3-46 Overlap Example

NOTE: *Show Blending Overlap appears as **Reserved** when Christie TWIST is installed.*

Other Functions

For convenience, the *Edge Blending* secondary menu also includes related options for enabling a specific color and/or test pattern, or for working with colors or the lamp. Such functions duplicate those provided elsewhere in the Menu system.

Edge Blending Procedure

Before You Begin. Make sure your source hardware and/or software can supply a tiled image for the number of projectors in use, and that the tiling includes overlapping data of approximately 12.5-25% along shared edges (see *Figure 3-46*). Tiling is not built into this model of projector.

Physically align the projectors and images from your intended external source, then match colors and Brightness Uniformity.

IMPORTANT! *For a shared edge, all Blend procedures and settings should be identical on BOTH projectors.*

1. Start with 2 full-screen projector images overlapping by approximately 12.5-25% each. Display a full white field test pattern from both.
2. In the *Edge Blending* secondary menu, enable the top check box to activate all controls.

NOTE: *If the optional Christie TWIST module is installed, a drop-down list replaces this check box (see right). Select the desired user-defined blend created for your current warp; no further blending at the projector is required. Or, to simply edge blending a non-warped flat image, select "Standard" and continue with Step 3.*

3. **SET STARTING POINTS FOR ADJUSTMENT**.
   - Set all blend widths to 0.
   - Go to "More" and set everything in the *Edge Blending* (2) menu to 50.

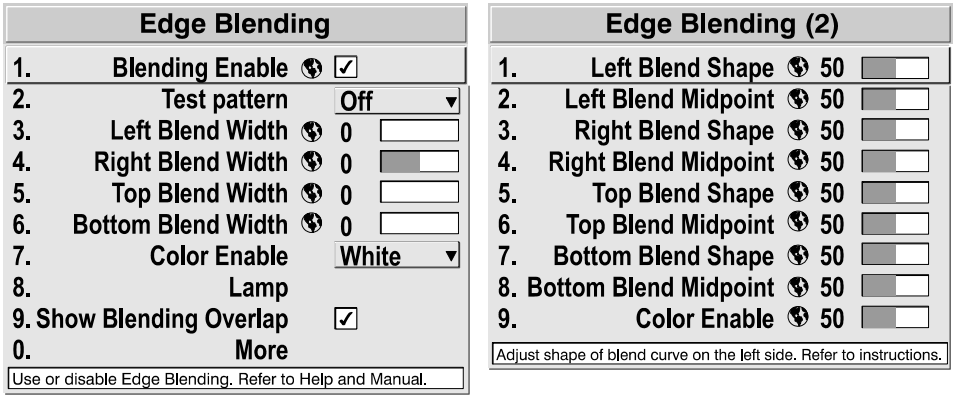


Figure 3-47 Set Starting Points for Each Projector

4. **Set Blend Width.** On one projector, increase the Blend Width for an overlapping edge (for example, if the projector's image is on left, its right edge overlaps the adjacent image-adjust **Right Blend Width**). Use the same setting on the second projector for this shared edge.
5. Re-adjust width (both projectors) until the overly bright band at the midpoint of the overlapping blends disappears or just changes to very light gray. For the shared edge, use the same **Blend Width** setting on each projector. If the "best blend" appears to be between two settings, choose the wider setting for both projectors.
6. **Check Blend**. If the blended region appears too dark or light in relation to the rest of the image:
   - Increase **Blend MidPoint** in both projectors to "lighten" the overall blend, decrease to "darken" the overall blend.
   - Adjust **Blend Shape** in both projectors to fine-tune change the amount of mid-gray intensity (as opposed to black/white) in the blend.
7. Repeat with remaining projectors / overlaps.
8. Check completed display wall with the desired external signal.
9. Adjust mechanical alignment if necessary to maintain perfect pixel-on-pixel alignment over time.

In applications where you are projecting only white or light images, the Blend Width may be slightly higher-set according to how much overlap you have between images.

3.13 Remote Control of the Projector

As an alternative to using a remote, most projector functions can be controlled remotely, typically at a controller such as a PC, via 1) simple bi-directional ASCII messaging on an Ethernet or serial communication link or 2) a web interface or "ChristieNET" on an Ethernet network.

Via ASCII Messenging. Connect a serial link between your controller and the RS-232 or RS-422 port (recommended), or open an Ethernet socket (i.e., Telnet) between your controller and the valid projector address. Valid ASCII codes and messages are documented in the *Christie Serial Communications* document available on the Christie website.

Via Web Interface. Connect your PC to the projector's Ethernet port. In your web browser (Internet Explorer, for example), enter the IP address of the projector you wish to control. This initiates a password-protected ChristieNET application-enter the factory default "**ccm7**" login and password to open the program. If the projector is powered up, you can access assorted menu options and slidebars.

Repeat for remaining networked projectors as desired. Keep in mind that multiple units can be controlled from one PC, but each unit will be in its own ChristieNET interface (web browser) at the PC. Likewise, you can make up to four separate web locations to a single projector.

The default login provides access to security settings, where you can define other users with the same or fewer rights. Use "**unlimited**" rights for most applications. For all logins, the Service menu is still protected with its own password.

NOTES: 1) *Any proxy server settings that interfere with this type of link should be disabled for using ChristieNET. Disable through Internet Explorer's < Tools> <Internet Options> <Connections> <LAN Settings>.* **2)** *Your PC must be Java-enabled to v1.4.2 or higher to run ChristieNET.* **3)** *Depending on your projector model, certain controls provided through ChristieNET are non-functional.*

3.14 Working with the Lenses

The **Zoom**, **Focus** and **Lens Offsets** using either the built-in keypad or standard IR remote as follows:

Table 3.8 Lens Settings

Zoom	Standard IR remote - Press ZOOM + LEFT Arrow or RIGHT Arrow Built-in keypad - Press ZOOM + UP Arrow or DOWN Arrow
Focus	Standard IR remote - Press FOCUS + LEFT Arrow or RIGHT Arrow Built-in keypad - Press FOCUS + UP Arrow or DOWN Arrow
Lens Offset	To move image: Standard IR remote - Press SHIFT + LEFT Arrow or RIGHT Arrow or SHIFT + UP Arrow or DOWN Arrow Built-in keypad - Press LENS SHIFT + Arrow keys to move image in selected direction

NOTE: 1) *The **Zoom** function does not apply to Fixed Lenses.* **2)** ***Focus*** *and* ***Lens Offset*** *apply to both fixed and zoom lenses.* **3)** *Refer to Section 2.4.1 Lens Installation and Section 2.12 Boresight Adjustment.*

The lens mount secures the primary zoom lens to the projection head. It provides 1) setup adjustments for correct boresight, and 2) motorized controlled focus, zoom and offsets for general use.

⚠ CAUTION ***Lens calibration must be performed each time a new lens is inserted or after performing manual lens mount adjustments. This is critical to the projector functioning properly. Failure to do so could result in damage to the lens mount, the projector, or the projection lens.***

To calibrate the lens, select the *Configuration > Diagnostics and Calibration > ILS Calibration > Reference Calibration* option from the Main menu. This allows the lens to find the center points of each axis (focus, zoom, horizontal, and vertical), the end stops, and other motion parameters.

3.14.1 Anamorphic Lens

NOTES: 1) *The anamorphic lens and its mounting structure are optional components.* **2)** *To install, replace or use the anamorphic lens, refer to the instructions included with the anamorphic lens mount kit.* **3)** *The optional anamorphic lens mount is required for use of the 1.26x anamorphic lens, producing 2.39:1 "scope" images. However, the lens mount cover must be removed when installating the anamorphic lens mount and in order to the use the MALM.*

An optional anamorphic lens (1.26x) can be installed into an optional motorized auxiliary lens mount, and then swung into place to widen a "squeezed" image into a properly proportioned "scope" display (2.39:1). This lens increases magnification across the width only; retaining the original proportions of the image, and is often used with screens where side-masking can be moved aside or in rooms having fixed side masking , but a very short throw ratio (throw distance/screen width).

3.15 Error Conditions

Occasionally the projector will encounter an error condition that can interrupt normal operation. Such a condition can be caused by a simple invalid entry, an input signal error (most common) or a system error. The manner in which users are to be notified of error conditions is set in the *Menu Preferences* menu:

- To see error messages displayed on-screen, select the *Screen* option
- To be notified via a serial communication only, select the *RS232* option.
- To receive both types of notifications, select *All*.
- To disable error messages (except for "invalid user key entry", which can't be hidden), select *OFF*.

NOTE: *Text-based status/error messages also appear in the LCD Status Display window above the built-in keypad at the rear of the projector. They are accompanied by their corresponding 2-digit error code next to the built-in keypad, legible at a greater distance. Normal operation is indicated by the "0N"status code.*

User Errors

Invalid User Entry

A entry not recognized by the projector triggers a short on-screen error message identifying the problem. For example, if you specify a channel number that is not available, the message "Invalid Channel will appear. Or if you try to enter the wrong password, you'll see "Invalid Password". Press ENTER or EXIT to clear the message and try again.

NOTE: *On-screen display of "Invalid User Entry" messages cannot be disabled, even if* ***Display Error Messages*** *has been set to "OFF".*

Input Signal Errors

An input signal error message occurs if you are in presentation level (i.e., there are no menus present) and have selected an input on which the projector detects a problem. While menus remain operational and any key press will temporarily remove any displayed error message, you must resolve the signal problem in order to permanently eliminate the message.

No Signal

The message "*No signal*" occurs when there is no source signal detected at the selected input-both HSYNC and VSYNC are inactive, and the screen background is black. Connect or correct the signal, or try another input.

Bad Sync

The message "*Bad Sync*" occurs when HSYNC or VSYNC are active , but the signal cannot be displayed. Such a condition occurs when only one of the two sync signals is present, or when either sync signal is unstable or of the wrong frequency. Correct the signal or select another input.

Other Signal Error Messages

In addition to the common "*Bad Sync*" and "*No Signal*" errors, you may encounter a signal error message indicating that HSYNC and/or VSYNC are either too fast or too slow. When such a message appears, check the frequencies shown in the Status menu. If they are correct, then the projector does not recognize the signal.

On some PCs you may be able to change the settings to generate a compatible signal. If the frequencies shown in the Status menu are incorrect, check the cabling to see where the problem might originate.

3.15.1 System Warnings/Errors

When the projector encounters a system malfunction, either a System Warning message or a System Error message may appear. Both types of messages are accompanied by a numerical error code on the "Status" LED and a related text message in the LCD Status Display window. A system malfunction can be cleared by pressing EXIT twice from the presentation level, but may indicate the need for service by a qualified Christie service technician.

NOTE: *System messages appear on-screen only if **Display Error Messages** has been set to "Screen" or "All".*

System Warnings

A system warning indicates that a system malfunction has been detected (see Status LED Codes, below). A system warning message replaces any input signal message and disappears when the input signal status changes. While the projector will remain operational, the message indicates the presence of a potentially serious problem that should be reported to the manufacturer. You can press EXIT twice to remove the message, but for best results you should reset the projector-power the projector down and up again with the POWER key.

System Errors

A system error message indicates that a serious malfunction has been detected and must be reported to the manufacturer as soon as possible (see Status LED Codes, below). The projector will no longer operate, and must be reset-power the projector down and up again with the POWER key.

NOTE: *Some error messages will require a full AC power cycle.*

The Status LED Codes

If the status code displayed on the back of the projector shows one of the following values, you have encountered a likely system error requiring the attention of a qualified service technician (see System Warnings and System Errors, above). Acknowledge and clear the error by pressing EXIT twice from presentation level, or try resetting the projector by powering it off and on again, cooling when necessary. Consult *Table 3.9* and if the problem persists, contact your dealer .

The specific code number identifies the source of the error detected, and is particularly useful in cases where the projector is too far away to read the accompanying text message in the LCD status display window.

For example, the code "27" means the lamp could not be turned on. Error codes for this projector are listed in *Table 3.9*.

Table 3.9 System Error Codes

Code	Description
GENERAL	
12	Software error. Contact dealer/factory.
13	CRC error in flash ROM. Download new software.
14	Engineering-only programming is complete. Call Christie, replace TIPM.
15	Attempting to download s/w code without being in boot mode
16	Invalid interrupt. Power off/on. If persists, contact dealer/factory.
17	User has forced system to stay in boot mode
18	Attempting to program boot mode without jumper
LAMP / BALLAST	
20	The lamp is unexpectedly on (likely a ballast and/or wiring problem)
22	One or more high-current lamp cables is not connected
26	Lamp door is open (interlock)
27	Lamp cannot ignite
28	Lamp has turned off unexpectedly
29	Lamp ballast is overheated
2C	Lamp communications fault; ballast is not detected
SENSORS for COOLING	
40	Lamp has shut down due to fan failure
46	The red TEC (DMD) has overheated
48	The blue TEC (DMD) has overheated
49	The prism has overheated
4C	Projector has shut down due to critical error
4D	Integrator has overheated
4E	Inadequate lamp air intake rate (interlock)
4F	Inadequate air exhaust rate (interlock)
FANS (note: there are no Fans 1 or 2 in this projector)	
53	Fan 3 has failed (side [rear] intake fan)
54	Fan 4 has failed (side [front] intake fan)
55	Fan 5 has failed (lamp exhaust fan)
56	Fan 6 has failed (LAD fan)
57	Fan 7 has failed (card cage fan)
58	Fan 8 has failed (heat exchanger fan — for liquid cooling system)

Table 3.9 System Error Codes

10-bit IMAGE PROCESSOR (TIPM)	
60	Boot code CRC failed
61	Unable to program the DigMux PLD
62	Unable to program the Control PLD
63	Unable to program the Bubks PLD
64	Unrecognized ROM type
65	Write to flash ROM failed
66	General TIPM failure
67	Downloaded code will not fit into ROMs
68	Communication error with scaler on TIPM
BUILT-IN KEYPAD or ID EEPROM	
70	Unable to access the built-in keypad EEPROM
71	EEPROM on the built-in keypad has re-initialized
IRAM (a.k.a. Panel Driver) or IRAM/TIPM Communications, or EFIB or Modular Formatters	
80	Unrecognized IRAM (a.k.a. Panel Driver)
81	Unable to program a device on the IRAM
82	TI flash download fault — critical error
83	TI flash download fault — partial success
84	TI flash download fault — partial success
85	TI I^2C fault (write failure)
87	Consecutive RDRAM faults from modular Formatters
90	Red modular Formatter link failure
91	Green modular Formatter link failure
92	Blue modular Formatter link failure
93	Modular Formatter Architecture error
94	Modular Formatter / DMD mismatch
95	Modular Formatter sequence mismatch
96	EFIB not responding to I^2C messages

Table 3.9 System Error Codes

BACKPLANE OR OPTIONAL MODULES	
A0	Unable to program the optional interface module
A1	Unable to power the optional interface module
A2	Unable to program the Backplane
A3	Unable to program the Warp Module option (*Christie TWIST*)

CHRISTIE

4 Maintenance

Installers, service trained operators and all other users must maintain a safe operating environment at all times. Read through this section in its entirety and understand all warnings and precautions before attempting to operate the projector.

4.1 Safety Warnings and Guidelines

This projector is designed for safe and reliable operation. However safe operation is not assured by design alone; installers, service technicians, trained operators and all other users must maintain a safe environment at all times.

IMPORTANT! **Please read through and understand all warnings and precautions before attempting to operate the projector.**

4.1.1 General Precautions

⚠ DANGER **Never look directly into the projector lens or at the lamp. The extremely high brightness can cause permanent eye damage. For protection from ultraviolet radiation, keep all projector housings intact during operation. Protective safety clothing and safety goggles are recommended when servicing. Keep hands, clothes and all combustible material away from the concentrated light beam of the lamp. Position all cables where they cannot contact hot surfaces or be pulled or tripped over.**

NOTES: 1) *The American Conference of Governmental Industrial Hygienists (ACGIH) recommends occupational UV exposure for an 8-hour day to be less than 0.1 microwatts per square centimeters of effective UV radiation. An evaluation of your workplace is advised to assure employees are not exposed to cumulative radiation levels exceeding the government guidelines for your area.* **2)** *Be aware that some medications are known to increase sensitivity to UV radiation.*

This projector must be operated in an environment that meets the operating range specification, as listed in *Section 6 Specifications*.

⚠ WARNING: **Fire Hazard**. *Keep hands, clothes, and all combustible material at least 1m away from the concentrated light beam of the lamp.*

⚠ WARNING: *Position all cables where they cannot contact hot surfaces or be pulled or tripped over.*

This projector must be installed in an environment that meets the operating range specifications in *Section 6 Specifications.*

⚠ WARNING: *Opening or removing a projector cover requires a qualified service technician.*

4.1.2 AC / Power Precautions

⚠ WARNING **Do not attempt operation if the AC supply is not within the specified voltage range.**

⚠ WARNING **Shock Hazard**. *Disconnect projection head and ballast from AC before opening any enclosure.*

Do not allow anything to rest on the power cords. Locate the projector where cords cannot be abused by persons walking on it or objects rolling over it. Never operate the projector if a power cable appears damaged in any way.

Do not overload power outlets and extension cords as this can result in fire or shock hazards.

NOTE: *Only a Christie accredited service technician is permitted to open any enclosure on the product, and only if the AC has been fully disconnected from the projection head and ballast.*

4.1.3 Lamp Precautions

Xenon arc lamps are under high pressure and must be handled with great care at all times. Lamps may explode if dropped or mishandled.

Wear Protective Clothing

Never open the lamp door unless you are wearing authorized protective clothing such as that included in a Christie Protective Clothing Safety Kit #598900-095. Recommended protective clothing includes, but may not be limited to, protective gloves, latex lab gloves, double-layer 0.040" acetate face shield, and a quilted ballistic nylon jacket or a welder's jacket. The face shield is provided with the projector.

⚠ WARNING **Explosion Hazard**. *Wear authorized protective clothing whenever the lamp door is open!*

⚠ WARNING *Never attempt to remove the lamp directly after use. The lamp is under increased pressure when hot and may explode, causing personal injury and/or property damage.*

NOTES: 1) *Christie's protective clothing recommendations are subject to change.* **2)** *Any local or federal specifications take precedence over Christie recommendations.*

Cool the Lamp Completely

The arc lamp operates at a very high pressure that increases with temperature. Failure to allow the lamp to sufficiently cool prior to handling increases the potential for an explosion causing personal injury and/or property damage. After turning the lamp off (powering down), it is crucial that you wait at least 10 minutes before turning the breaker/power switches OFF, disconnecting AC, and opening the lamp door. This provides enough time for the internal lamp cooling fans to properly cool the lamp. Cool completely before handling. Again, always wear Christie-approved protective clothing!

⚠ WARNING *Never attempt to access the lamp while it is on. Wait at least 10 min. after lamp shut-off before powering down, disconnecting from AC, and opening the lamp door.*

⚠ WARNING **SHOCK HAZARD**. *Disconnect projection head and ballast from AC before opening the lamp door.*

For all other precautions critical for safe removal and replacement of the lamp, refer to *Section 4.4.1 Lamp Replacement Procedure*.

4.2 Maintaining Proper Cooling

The high-intensity lamp and electronics rely on a variety of cooling components to reduce internal operating temperatures. Regular checking and maintenance of the entire cooling system is critical to prevent overheating and sudden projector failure, and helps to ensure reliable operation of all projector components over time.

4.2.1 Ventilation

Vents and louvers in the projector covers provide ventilation, both for intake and exhaust. Never block or cover these openings. Do not install the projector near a radiator or heat register, or within an enclosure.

4.2.2 Air Filter

It is recommended that you replace the air filter (located on the lamp side of the projection head) whenever you replace the lamp, or sooner, in dusty or dirty environments. A clogged filter reduces airflow, and can lead to overheating and failure of the projector. Check monthly. Refer to *Section 4.4.2 Filter Replacement Procedure* for instructions.

4.2.3 Liquid Cooler

The liquid cooler system circulates liquid to and from the DMDs in the projection head, reducing their operating temperature to an acceptable level. Periodically check the coolant level visible by opening the Igniter compartment door. The reservoir is approximately ½ full.

NOTE: *A failure of the liquid cooling system will trigger an over-temperature alarm condition, clearly indicated with status displays/lights at the rear of the projector.*

Filling the Cooler

Fill approximately 1/2 full. Fill with Christie's 50/50 mix of distilled water and ethylene glycol. Top up as necessary, making sure not to over fill.

IMPORTANT! Whenever coolant has been added or replaced, check for a possible airlock at the next projector power-up.

4.3 Maintenance and Cleaning

To help ensure optimized performance and reliability, check electrical, optical and other components regularly as described below.

⚠ WARNING Shock Hazard. *Disconnect projection head and ballast from AC at BOTH wall breakers.*

4.3.1 Electrical

Do the following every 60 days or 500 hours of projector use (always disconnecting both the projection head and ballast from AC first):

- Check the contact surfaces of positive (anode) and cathode (negative) connections for cleanliness. Clean electrical contact surfaces as necessary to prevent contact resistance from scorching connectors.
- Verify that all electrical and lamp connections are tight.

4.3.2 Optical

Unnecessary cleaning of optics can be more harmful than helpful, increasing the risk of degrading delicate coatings and surfaces. In this projector, check only the lens and lamp reflector. Maintenance of other optical components requires a Christie accredited service technician. Check these components periodically in a clean, dust-free environment using a high-intensity light source or flashlight. Clean them only when dust, dirt, oil or other marks are obvious. Never touch an optical surface with your bare hand-always wear latex lab gloves.

When to Check the Lens

A small amount of dust or dirt on the lens has minimal effect on image quality-to avoid the risk of scratching the lens, clean the lens only if absolutely required. See below.

When to Check the Lamp Reflector

Inspect the mirror surface (reflector) for cleanliness only during a lamp replacement, when the lamp is out. If necessary, clean as described below, and ensure that you wear protective clothing while inspecting or cleaning.

NOTE: *It is normal that the color on the reflector surface may vary.*

Supplies

For cleaning off dust and/or grease, you will need:

- Soft camel-hair brush
- Dust-free blower-filtered dry nitrogen blown through an anti-static nozzle.
- Dust-free lens tissue such as Melles Griot Kodak tissues (18LAB020), Optowipes (18LAB022) or Kim Wipes or equivalent
- Lens cleaning solution such as Melles Griot Optics Cleaning Fluid 18LAB011 or equivalent. For lens only.
- Methanol. For reflector only.
- Cotton swabs with wooden stems only
- Lens cleaning cloth/microfibre such as Melles Griot 18LAB024 or equivalent.

Cleaning the Lens

If Dusty:

1. Brush most of the dust off with a camelhair brush and/or blow dust away with compressed air.
2. Fold a microfibre cloth smooth and gently wipe remaining dust particles off the lens. Make sure to wipe evenly with the smooth portion of the cloth that has no folds or creases. Do not apply pressure with your fingers. Instead, use the tension in the folded cloth itself to collect the dust.
3. If significant dust is still bound to the surface, dampen a clean microfibre cloth with lens cleaning solution (damp, not dripping). Wipe gently until clean.

If Fingerprints, Smudges, Oil:

1. Brush most of the dust off with a camelhair brush and/or blow dust away with compressed air.
2. Roll a lens tissue around a swab and soak in lens cleaning solution. Tissue should be damp but not dripping.
3. Gently wipe the surface using a figure 8 motion. Repeat until blemish is removed.

Cleaning the Reflector

If Dusty:

1. Brush most of the dust off with a camelhair brush and/or blow dust away with compressed air.
2. If some dust remains, just leave as is-air circulating at the lamp is unfiltered, so some dust is inevitable. Avoid unnecessary cleaning.

If Fingerprints, Smudges, Oil:

1. First brush dust off with a camelhair brush and/or blow dust away with compressed air.
2. Fold a clean microfibre cloth and dampen with methanol. Make sure to wipe evenly with the smooth portion of the cloth that has no folds or creases. Do not apply pressure with your fingers. Instead, use the tension in the folded cloth itself to collect the dust.

4.3.3 Other Components

In a normal operating environment check, clean and treat the following components every 6 months or so to help ensure proper lamp and projector function:

Igniter

Clean the high voltage terminal and insulator to remove accumulated dust or dirt.

Air Flow Interlocks

The lamp fan vane switch is located within the lamp-cooling compartment. The extractor vane switch is located just inside the top duct on the projector lid. Check and, if necessary, clean the switches to remove accumulated dust or dirt that could impede movement. Within the exhaust hood connected at the top of the projector, adequate airflow must be maintained and routed away from the operating area surrounding the projector (or any nearby projectors). Inspect regularly and confirm that all air intake areas of the projection head and ballast are unobstructed.

4.4 Replacing the Lamp & Filter

The high brightness of your projector is provided by a Xenon lamp mounted at two ends within a reflector and housed in the locked lamp compartment of the projection head. When the lamp approaches the end of its life, it must be replaced-do not exceed warranted lamp life by more than 20%, as an old lamp becomes increasingly and dangerously fragile, resulting in possible explosion.

To determine the age of your current lamp, consult the *Status* menu or *Lamp* menu.

It is recommended that you replace the air filter with every lamp replacement, or sooner in dusty or dirty environments. Check its condition monthly in all projectors.

4.4.1 Lamp Replacement Procedure

NOTE: *For this procedure, you need a compatible Christie Xenon CDXL or CXL lamp as shown in Section 6 Specifications. NEVER install a lamp intended for a different projector.*

⚠ WARNING *Make sure to use the correct wattage lamp supplied by Christie.*

⚠ WARNING *Lamp replacement is to be done by a Christie accredited service technician only.*

⚠ WARNING **Explosion Hazard**. *Wear authorized protective clothing whenever the lamp door is open! Never apply a twisting or bending force to the quartz lamp body.*

Read and follow all other general lamp precautions in *4.1, Warnings and Guidelines*.

1. By pressing and holding the POWER button (any remote or keypad), turn OFF the projector.
2. Once OFF, allow the fans to run at least 10 minutes for cooling the lamp.

⚠ WARNING *Never attempt to remove the lamp when it is hot. The lamp is under high pressure when hot and may explode, causing personal injury and/or property damage.*

3. Set the ballast breaker/switch to OFF.
4. Disconnect projection head and ballast from AC power supply.

⚠ WARNING **Shock Hazard**. *Disconnect both components from AC.*

Wearing protective clothing and face shield, unlock the lamp door and open it. Refer to *Figure 4-2*. If desired, release the tethered latch mechanism to remove the door entirely.

Unscrew the knob on the lamp cooling compartment door, and remove the door to reveal the cathode end (-) of the lamp. Refer to *Figure 4-2*.

5. Remove the old lamp and inspect the reflector as follows:
   a. Loosen setscrews from negative/cathode (rear, 7/64") and positive/anode (front, 3/16") lamp connectors. These screws are shown in *Figure 4-2*. Make sure to apply minimal torque and DO NOT STRESS the quartz tube.
   b. Carefully slip the positive anode connector off the front of the lamp.
   c. Handling by the cathode end only, unscrew the lamp from the rear connector and carefully remove from the projector. Immediately place the lamp inside the protective cover (saved from previous installation) and then seal it in a heavy carton on the floor where it cannot fall or be bumped.

⚠ WARNING *Handle box with extreme caution-the lamp is hazardous even when packaged. Dispose of lamp box according to safety regulations for your area.*

   d. With the lamp removed, visually inspect the reflector for dust. Clean if necessary as described in *Section 4.3 Maintenance and Cleaning*.

6. Remove the new lamp from it's protective cover as follows:
   a. Remove tape, knurled nut and locking star washer (if present) securing the lamp within its cover.
   b. Handling at the ends only, extract the lamp from the cover. Set aside the protective cover for re-use in your next lamp disposal or for warranty return of an expired lamp.
7. Install the new lamp as follows:
   a. With protective clothing and face shield on, insert the threaded cathode (-) end of the lamp into the negative lamp connector nut located in the rear of the lamp compartment and screw in fully (refer to *Figure 4-1*, left portion). Hand-tighten only.

IMPORTANT! *Handle by the cathode/anode end shafts only, never the glass. Do not over-tighten. Do not stress the glass.*

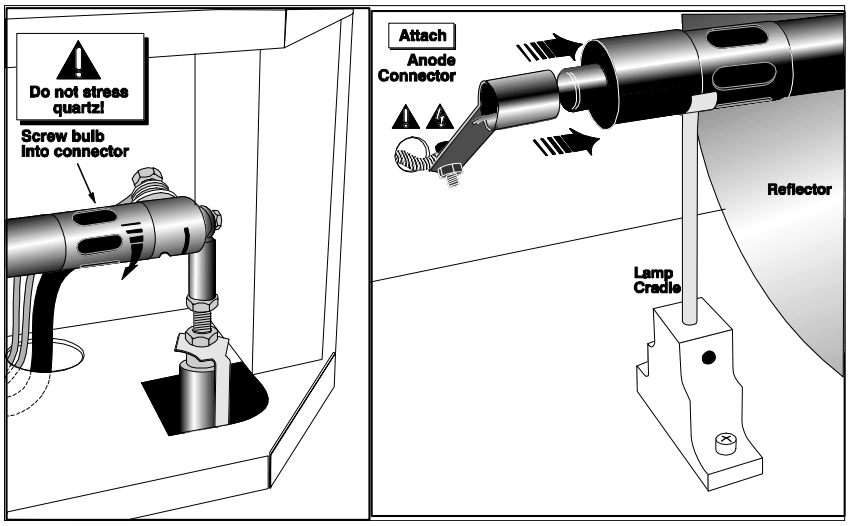


Figure 4-1 Install Bulb

b. Rest the anode (+) end of the lamp on the lamp cradle as shown in *Figure 4-1*, right, and slip the positive lamp connector over the bulb end.
c. Tighten setscrews in both negative and positive lamp connectors as shown in *Figure 4-2*.

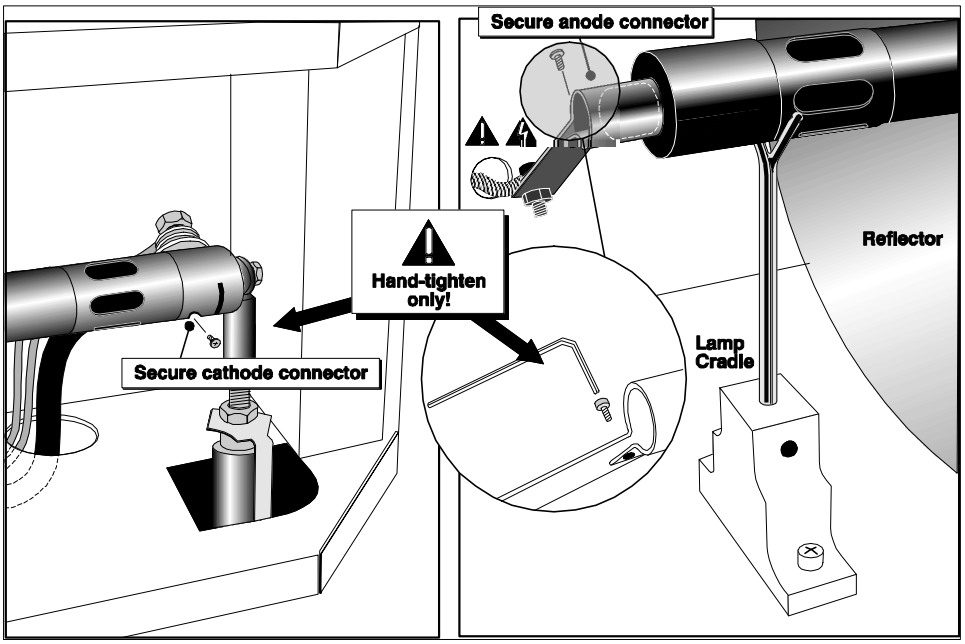


Figure 4-2 Secure Bulb at Cathode (-) and Anode (+) Connectors

IMPORTANT! *Proper electrical contact prevents resistance in the lamp connectors. If you accidentally touch the quartz body of the lamp with your bare hands, clean the surface as described in 4.3, Maintenance and Cleaning.*

8. Make sure that the anode (+) lead between lamp and Igniter is well away from any projector metal, such as the reflector or firewall.

⚠ WARNING **Leads too close to metal parts will cause arcing during starting pulse. This is a Safety Hazard, and the lamp may not ignite.**

9. Re-install the cooling compartment door and close the lamp compartment door.

NOTE: *The projector will not operate unless the louvered lamp compartment door is locked shut.*

10. With a blue dot label or dry-erase pen, mark the lamp door's **LAMP INSTALLED** label to indicate the size of the newly installed lamp - 2.0, 3.0, 4.5, or 6.0 kW. A supply of blue dot labels is secured inside the front cover of this manual.

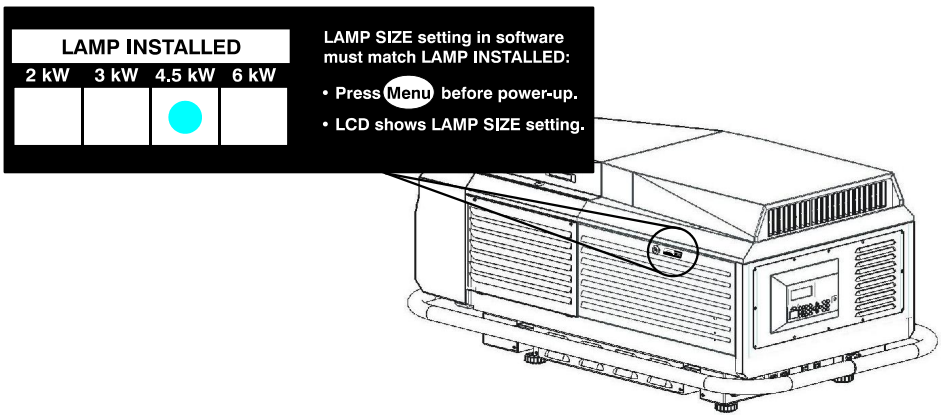


Figure 4-3 Always Mark the "Lamp Installed" Label (*EXAMPLE*)

11. Re-connect the projection head and the ballast to AC (refer to *Section 2.1 Projector Quick Setup and Installation*), and then set the breaker/power switch to ON.

12. Set proper **Lamp Type** (MENU).

NOTE: *Not required if your new lamp is the **same Lamp Size** (in kilowatts) as the previous lamp.*

If your new lamp is rated higher or lower than the old lamp, record the new Lamp Size (2.0, 3.0, 4.5 or 6.0 kW) in projector memory as described below. This setting establishes the proper range of power available for the installed lamp, ensuring that the new lamp is neither underpowered nor over-driven upon power-up.

⚠ WARNING **Do not attempt to ignite the lamp until its size (kW) is correctly defined in projector memory.**

Refer back to *Figure 3-33*.

a. Press MENU. The **Status Display** at the rear of the projector shows a "Lamp Size" of 2000, 3000, 4500, or 6000 (Factory default) watts, depending on its last setting.

b. Enter either the **Lamp Password** shown in *Figure 3-34*, or the Christie service password. A password is required unless the "Enable Password" service option has been turned off.

c. Use the RIGHT and LEFT Arrow keys to locate and select which lamp is currently installed. Make sure the lamp type is also indicated on the lamp door label as shown in *Figure 4-3*.

d. When the **Status Display** shows the correct lamp type, the projector and lamp can be turned on.

13. Press POWER on any keypad/remote to power up the projector and ignite the lamp. Wait approximately 10 minutes for the projector and lamp to warm up before continuing.

14. Adjust lamp position.

    From the *Lamp* menu, go to the *LampLOC* secondary menu and perform a "Do Auto" adjustment. It takes a minute or two as internal motors and sensors determine the ideal placement of the lamp. Proper LampLOC ensures maximum brightness, with the lamp well-centered in the reflector and distanced correctly from the rest of the illumination system. Refer to *Section 3.10.6 Adjusting Lamp Position (LampLOC™)* for details.

15. Record the serial number of the new lamp, as follows:

    a. In the *Lamp* menu, select "Change Lamp".

    b. In the *Lamp S/N* text box, enter the serial number.

    c. Press ENTER on either keypad to record the number and to reset the lamp timer. The timer now begins to log time for the new lamp.

4.4.2 Filter Replacement Procedure

Replace the air filter whenever the lamp module is replaced, or more frequently if operating the projector in a dusty or dirty environment. Check monthly in all cases. The filter is located on the lamp side of the projection head, near the front.

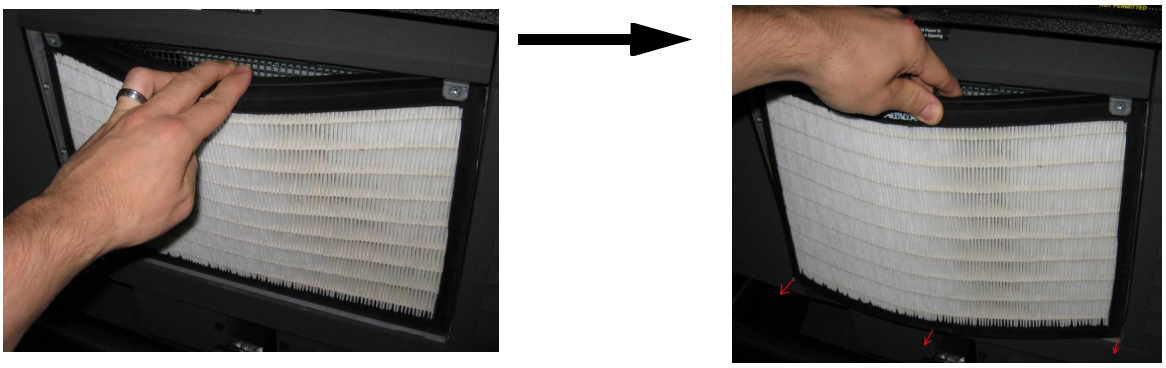
Removing the Air Filter

⚠ WARNING Switch OFF the projector and disconnect the AC power cord.

1. By pressing and holding the POWER button (any remote or keypad), turn OFF the projector.
2. Once OFF, allow the fans to run at least 10 minutes for cooling the lamp.
3. Set the breaker/power switch to OFF.
4. To open/remove the filter compartment door, loosen 2 corner screws using a flat screwdriver, and lift off door.

5. Remove the air filter as follows:

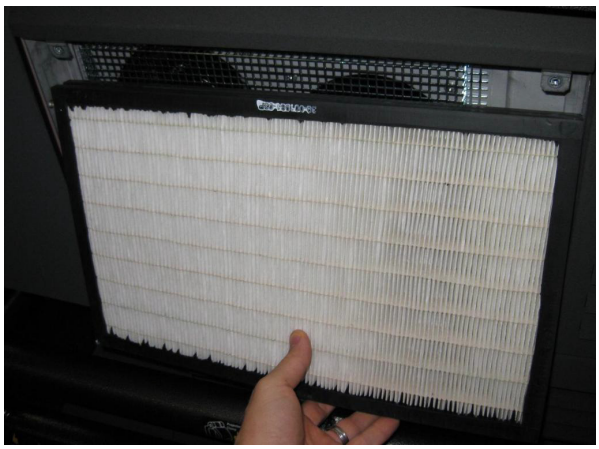
   Using your fingers, pull out top of filter to remove, as shown.



⚠ WARNING ***Only*** *use Christie filters. Never operate the projector without the filter installed.*

Replace/Install New Air Filter

1. To replace or install a new filter, place the top of the air filter inside the air filter compartment and slide all the way up behind the tabs, then push the bottom of the air filter in.



2. With the filter in place, insert the bottom tabs of the filter door into the corresponding slots, close the filter door, and secure again with the 2 screws.

4.5 Replacing a Lens

A variety of lenses can accommodate different throw distances and specific types of installations. Refer to the Christie website for throw distance calculations.

To replace or change a lens:

1. Unclip the lens safety tether from the handles or FredFrame .
2. Release the lens-locking lever (**UP** position).

3. Pull out lens and replace as described in *Section 2.4.1 Lens Installation*. Insert all the way back, following **UP** label on lens.

NOTE: *Ensure that the Zoom connector is fully engaged.*

⚠ WARNING ***In the event a lens is dropped, the lens tether and clamp assembly may become stressed, and therefore must be replaced before continuing its use. Failure to do so could result in injury or death.***

⚠ CAUTION ***Lens calibration must be performed each time a new lens is inserted or after performing manual lens mount adjustments. This is critical to the projector functioning properly. Failure to do so could result in damage to the lens mount, the projector, or the projection lens.***

Make sure to secure with lens locking lever (**UP** position) and safety tether: Refer to *Figure 2-23*.

NOTES: 1) *Make sure the lens **UP** label faces up, otherwise boresight may need readjustment.* **2)** *Keep the lens safety tether attached to the projector 's handle or FredFrame™ for use with any lens ring clamp. This cable **MUST** be used with a flown projector.*

5 Troubleshooting

If the projector does not appear to be operating properly, note the symptoms and use this section as a guide. If the problem cannot be resolved, contact your dealer for assistance.

NOTE: *A Christie accredited service technician is required when opening an enclosure to diagnose any "probable cause".*

5.1 Power

5.1.1 Projector Does Not Power ON

Check for the following:

- Check the switch on the AC receptacle. If it is in the **A+B** position (right) there must be two line cords connected (one of which is not provided) in order to operate in this state.
- Ensure the display backlight and the LEDs on the built-in keypad are functioning, and check if the menus are displayed. If the built-in keypad is not functioning, it may need to be replaced.

5.2 Lamp

5.2.1 Lamp Does Not Ignite

Check for the following:

- Is there an interlock failure? From the *Status* menu, check the *Alarms* and *Interlocks* secondary menu. From the web user interface, check the *Status: System* menu.
- If there is any indication through the *Status* menu of a ballast communication problem, re-boot the projector and try turning the lamp ON again.
- If a DMD temperature is too high, the lamp will not ignite. Cool the projector and try again. Ensure there is proper ventilation. If an optional exhaust is used ensure it has adequate airflow.
- If the lamp does not ignite after the second attempt, replace the lamp.
- Listen for a “clicking” noise to indicate the ballast is attempting to strike the lamp. If you do not hear anything, it may indicate a problem with the ballast (a Christie accredited service technican is required to resolve the issue).
- If you hear a brief “click”, but no light appears, the lamp likely needs replacement.

5.2.2 Lamp Suddenly Goes OFF

Check for the following:

- Check lamp power through the *Lamp* menu or from the web user interface *Advanced: Lamp* menu. Try increasing lamp power.

NOTE: *Older lamps may not reliably operate at significantly lower than rated power.*

- The DMDs may be overheated. Check for an alarm condition.
- An interlock may be interrupting lamp function.
- Replace the lamp.

5.2.3 Flicker, Shadows Or Dimness

Check for the following:

- Ensure the shutter is open.
- LampLOC™ may need re-adjustment.
- LampLOC™ may be in the middle of its adjustment. Wait approximately 2-3 minutes.
- Adjust LampLOC™ motors manually, via the *Main* menu. Confirm all stepper motors are operational by watching on screen with a full white test pattern while adjusting.
- Increase lamp power, if possible. Lamps which are near end of life may not operate reliably at lowest power range.
- Fold mirror misalignment (a Christie accredited service technican is required to resolve the issue).

5.2.4 LampLOC™ Does Not Seem to Work

Check for the following:

- If the *Do Auto* LampLOC™ function does not work, try adjusting the lamp position manually, via the *LampLoc>Manual Adjust* menu. Observe screen brightness by adjusting the XYZ values or use a light meter to check for changes in brightness.
  - Use a Minolta™ T10 illuminance meter (hand-held): Position meter in center of screen to take reading.

Or

  - Use a Minolta™ LS-100 luminance meter: Point the lens at the center of the screen to take a reading. Retake the reading each time an adjustment is made.
- Always adjust XY values before adjusting Z values. Repeat XY adjustments any time Z is adjusted. If brightness levels are not changing when adjusting the XYZ motors it is likely 1 of the motors is damaged, the stepper driver board has malfunctioned or there is a faulty connection.

5.2.5 LiteLOC™ Does Not Seem to Work

Check for the following:

- Ensure LiteLOC™ is set and enabled in the *Lamp* menu.
- If the lamp power has reached its maximum setting, the light intensity reading still can not meet the target; however, it appears it is not functioning. For example, if the lamp power range is from 1kW (light intensity reading 4000) to 3kW (light intensity reading 6000) and the light intensity is set to 10,000 it will never find the maximum lamp power level because the light intensity is set too high. In this case, simply reduce the LiteLOC™ value within (4000, 6000).

5.3 Calibrating the Lens Mount

The lens mount must be calibrated when:

- a new lens has been installed
- the lens mount has been replaced
- lens settings are drifting within a short period of time

To calibrate the lens, do one of the following:

- Select *Lens>Lens Calibration* from the *Main* menu. From the *Lens Calibration* menu, select *All Axes* or do each axes individually.

Or

- Access the *Advanced>Lens* menu, via the web user interface, and select *Calibrate*.

⚠ CAUTION ***Lens calibration must be performed each time a new lens is inserted or after performing manual lens mount adjustments. This is critical to the projector functioning properly. Failure to do so could result in damage to the lens mount, the projector, or the projection lens.***

5.4 Built In Keypad

5.4.1 Projector ON, but No Backlight on Built-In Keypad

Check the following:

- Confirm the harness is plugged into the back of the built-in keypad (accessible via the lamp compartment door).
- Touch any key. The backlight for the displays and keys should be present.

5.5 Image Displays

The following troubleshooting entries assume the use of a third-party input source. Before proceeding, consult the documentation supplied with the external equipment.

5.5.1 Blank Screen, No Display of Image

Check the following:

- Confirm all power connections are still OK.
- Ensure the lens cap is not on the lens.
- Ensure the shutter is OPEN. Press SHUTTER OPEN on the standard IR remote or built-in keypad to open.
- Ensure a full black test pattern **is not** selected for display.
- Check connections.

5.5.2 Severe Motion Artifacts

Most likely there is a synchronization problem with reversed 3-2 drop-down in 60Hz-to-24Hz film-to-digital conversion in your source. The display file needs correction.

5.5.3 Image Appears Vertically Stretched or 'Squeezed' into Center of Screen

Source data converted from film and "pre-squeezed" for Roadie HD+35K display format may require use of an anamorphic lens (or resizing) to regain full "scope" image width and proper proportions.

5.5.4 The Projector is ON, but There is No Display

Check the following:

- Ensure the lens cover is removed from the lens.
- Ensure shutter is OPEN.
- If the lamp is not ignited press *Lamp ON* from the the standard IR remote or built-in keypad.
- Ensure AC power is connected.
- Is an active source connected properly? Check the cable connections and ensure the alternative source is selected.
- Can you access test patterns? If so, check source connections again.

5.5.5 The Display is Jittery or Unstable

Check the following:

- If the image display is jittery or blinking erratically, ensure the source is properly connected and of adequate quality for detection. With a poor quality or improperly connected source, the projector repeatedly attempts to display an image, however briefly.
- The horizontal or vertical scan frequency of the input signal may be out of range for the projector.
- The sync signal may be inadequate. Correct the source problem.

5.5.6 The Display is Faint

Check the following:

1. The source may be double terminated. Ensure the source is terminated only once.
2. The source (if non-video) may need sync tip clamping.

5.5.7 The Upper Portion of the Display is Waving, Tearing or Jittering

This can occur with video or VCR sources. Check your source.

5.5.8 Portions of the Display are Cut OFF or Warped to the Opposite edge

Resizing may need adjustment. Adjust until entire image is visible and centered.

5.5.9 Display Appears Compressed (Vertically Stretched)

Check the following:

- The frequency of the pixel sampling clock is incorrect for the current source.
- Sizing and positioning options may be adjusted poorly for the incoming source signal.
- Use an anamorphic lens for typical HDTV and anamorphic DVD sources that have been re-sized and vertically stretched, via 3rd-party software.

5.5.10 Data is Cropped from Edges

To display the missing material, reduce image size to fill the display area available in the projector, then stretch vertically to fill the screen from top to bottom. Add the anamorphic lens to regain image width, if required.

5.5.11 Display Quality Appears to Drift from Good to Bad, Bad to Good

Check the following:

- The source input signal may be of low quality.
- The H or V frequency of the input may have changed at the source end.

5.5.12 Display has Suddenly Froze

If the screen blacks out inexplicably, it is possible excessive voltage noise on the AC or ground input has interrupted the projector's ability to lock on to a signal. Power down and up again.

5.5.13 Colors in the Display are Inaccurate

The color, tint, color space and/or color temperature settings may require adjustment at your input source, or in the projector.

5.5.14 Display is Not Rectangular

Check the following:

- Check leveling of the projector. Ensure the lens surface and screen are parallel to one another.

NOTE: *Ensure the keystone setting is properly set.*

5.5.15 Display is “Noisy”

Check the following:

- Display adjustment at the input source may be required. Adjust pixel tracking, phase and filter. Noise is particularly common on YPbPr signals from a DVD player.
- Ensure the video input is terminated (75Ω). If it is the last connection in a loop-through chain, the video input should be terminated at the last source input only.
- The input signal and/or signal cables carrying the input signal may be of poor quality.
- If the distance between the input source device and the projector is greater than 25 feet, signal amplification/conditioning may be required.
- If the source is a VCR or off-air broadcast, detail may be set too high.

6 Specifications

This section provides detailed Roadie HD+35K specifications. Due to continuing research, specifications are subject to change without notice.

6.1 Display

6.1.1 Panel Resolution and Refresh Rate

Pixel format (H x V) on 3 DMDs	2048 x 1080
Refresh rate, 2D displays	23.97 - 65 Hz
Refresh rate, frame-doubled 3D	23.97 - 96 Hz
Input-to-Image Delay	2 frames +30 lines (if locked to input) 3 frames (no timing restrictions)

6.1.2 Achievable Brightness

Typical output using CDXL lamps:

- 32,500 ANSI lumens (35,000 Center lumens) – 6.0kW Lamp
- 27,000 ANSI lumens (29,000 Center lumens) – 4.5kW Lamp
- 18,000 ANSI lumens (19,500 Center lumens) – 3.0kW Lamp
- 12,000 ANSI lumens (13,000 Center lumens) – 2.0kW Lamp

6.1.3 Achievable Contrast Ratio

With CDXL lamp and standard optical aperture installed:

- With standard high-brightness lens: 2000:1 full field
- With optional high-contrast lens: 2800:1 full field

6.1.4 Colors and Gray Scale

Default color temperature	6500K +950K/-650K
Range of color temperature adjustment	3200K - 9300K
Displayable colors	1.1 billion
Gray scale resolution	10 bits each per RGB component

6.1.5 Gamma

Adjustable from 1.8 - 2.8 (default = 2.2 ± 0.4)

6.2 Lenses

IMPORTANT! Use the lens and screen size to calculate the precise throw distance using the tables provided in the *Dealer Section* of the *Christie Website, PN 020-100395-xx*. Due to lens manufacturing tolerances for lens focal length, actual throw distance and vary ±5% between lenses with the same nominal throw ratio.

6.3 Inputs

Total number of standard inputs	6 *(including Dual SD/HD-SDI).*

NOTE: *Not applicable with all models.*

6.3.1 Analog: RGB / YPbPr (5 BNCs at INPUT 1)

Scan format	Interlaced or Progressive
Signal types / color spaces	RGB
	YPbPr
Horizontal frequency range	15 – 120 kHz
Vertical frequency range *	23.97 – 150 Hz
Pixel clock rate	13 – 220 MHz min.
Active pixels per scan line (H)	640 – 2048
Active lines per field/ frame (V)	200 – 1536
A/D conversion resolution	10-bit
Input levels	
R,B,G,Y — with sync	
R,G,B — without sync	$1.0V_{p-p}$ ±2 dB ($0.79V_{p-p}$ – $1.26V_{p-p}$)
Pb,Pr	$0.7V_{p-p}$ ±2 dB ($0.56V_{p-p}$ – $0.88V_{p-p}$)
	$0.7V_{p-p}$ ±2 dB ($0.56V_{p-p}$ – $0.88V_{p-p}$)
DC offset	± 5V
Nominal impedance	75Ω
Max. return loss (VSWR)	1.2:1 dB @ 200 MHz

* *Specifies frame rate for non-interlaced sources and field rate for interlaced sources. Input frequencies higher than the maximum panel refresh rate are displayed at a lower rate.*

6.3.2 Analog: Video (INPUTS 3 and 4)

Signal formats	Composite (CVBS), S-Video (Y/C)
Connectors	
• Composite Video *(INPUT 3)*	BNC
• S-Video *(INPUT 4)*	4-pin miniature DIN
Video standards	NTSC, NTSC 4.43, PAL, PAL-M, PAL-N, PAL-60 & SECAM
A/D conversion resolution	8-bit

Input levels	
Composite	1.0 V_{p-p} ± 3dB *(including sync tip)*
S-Video, Luma (Y)	1.0 V_{p-p} ± 3dB *(including sync tip)*
S-Video, Chroma (C)	630 mV_{p-p} nominal (burst)
DC offset	± 2V
Nominal impedance	75Ω
Maximum return loss (VSWR)	1.2:1 dB @ 6 MHz

6.3.3 Analog: Sync (Interlaced or Progressive Scan Format)

Input levels *(for composite or separate H & V)*	$0.5V_{p-p}$ – $4.0V_{p-p}$
Impedance *(for composite or separate H & V)*	75Ω
Sync type *(for composite or separate H & V)*	Separate H and V
	Bi-level or tri-level sync-on-green
	Bi-level or tri-level composite
	Serrations and/or Equalization pulses
	MacroVision™ for stnd. & prog. video
Polarity *(for composite or separate H & V)*	Positive or negative
Maximum return loss (VSWR)	1.2:1 dB @ 200 MHz

6.3.4 DVI-I (INPUT 2)

Interface standard	DDWG DVI 1.0
Signal types / color spaces	RGB (digital or analog)
	YPbPr (analog)
	YCbCr (digital) *not supported in v1.1* s/w
Pixel clock rate	25 – 165 MHz
Analog sync input impedance	1 k
Maximum cable length	5 meters (16 ft.)
Supports EDID and HDCP	

For all other DVI specifications, refer to *6.3.1 Analog: RGB / YPbPr (5 BNCs at INPUT 1)* above.

6.3.5 Dual SD/HD-SDI (INPUT 5 or 6, Standard with Projector)

Number of inputs	2, each with active loop-through
Connector type	BNCs, 75Ω
Supported interface standards	SMPTE 259M *(13.5 MHz clock modes only)*
	SMPTE 292M and 372M *(dual link)*
Signal types / color spaces	Serial digital YCbCr *(4:2:2 only)*
Pixel clock rates supported	13.5 MHz, 74.25 MHz, 74.25/1.001 MHz

6.4 Control

6.4.1 Wired Remote (Converted from IR Remote)

2 inputs on projection head	• 3-pin XLR connector (rear) • 3.5mm phono jack (side)
Input levels	• High = 2.2 V – 5.6 V (or open) • Low = -0.6V – 0.9V @ 1mA
Voltage output	+5VDC ±5%
Current output	100 mA nominal, 250 mA max.
Cable length	25 ft.

6.4.2 IR Remote

Number of IR sensors on projector	2 (front and rear)
Wavelength of peak sensitivity	1000 nm (approx.)
Modulation (carrier) frequency	38 kHz (nominal)
Encoding method	bi-phase
Range	100 ft.
(using optional “lite” remote)	50 ft. min.

Assumes no fluorescent lighting interference.
If range appears limited, shield the IR sensor, turn off lights, or change your fluorescent ballast.

6.4.3 Ethernet

Number of ports	1
Standard	100Base-TX
Connector type	RJ-45
Max. baud rate	115200

6.4.4 RS-232 Serial Input

Number of connectors	2
Connector type	9-pin subminiature D (female=in, male=out)
Max. baud rate	115200

6.4.5 RS-422 Serial Input

Number of connectors	2
Connector type (side input panel)	1 x 9-pin subminiature D
Connector type (rear connector panel)	1 x 6-pin XLR
Max. baud rate	115200

6.4.6 GPIO Input

Number of I/O lines	7, each assignable as input or output
Connector type	9-pin subminiature D (male)
Type of connection	Dry contact
Output sink current *(logic low)*	100 mA @ 1V
Maximum power output	+12VDC @ 200 mA
	NOTE: *Shared with 9-pin RS422 port.*

6.4.7 Control Port (From Ballast)

Number of connectors	1
Interface	RS232
Connector type	9-pin subminiature D (male)

6.4.8 Ballast Ports

Number of connectors	1
Interface	+5V TTL-compatible **NOTE:** *Opto-isolated at ballast end.*
Connector type	9-pin subminiature D (female)
Number and type of outputs	1 – lamp enable (low = enable lamp) 4 – safety interlocks (high = disable lamp) 1 – +5VDC for opto-isolated interface

6.5 Power

6.5.1 Projection head

Projection Compartment AC *(near Panel B, at front)*

Connector type & rating	(1) IEC 320-compatible, 10 A rating
Voltage range, nominal	200 – 240 VAC ±10%
Line frequency, nominal	50 – 60 Hz
AC input rating	10 A
Max. inrush current	35 A
Max. current consumption	3 A
Max. power consumption	700 W

Lamp (DC)

Max. operating voltage	46 VDC
Max. start-up voltage	155 VDC
Max. current consumption	180 A
Max. power consumption	6600 W
Connector type	Female CAM Lock receptacle (+red) Male CAM Lock receptacle (–black)

6.5.2 7 kW 3-Phase Ballast (38-814001-51)

Input Ratings	200-230 V 3~ +PE, 24 A, 50-60 Hz/380-415V 3~ +N +PE, 16 A, 50-60 Hz
Inrush current (max.) *note: excluding lamp*	<50 A
Power consumption (max.)	14.4 kVA (9.1 kW), all regions
Current rating (continuous) of 3-phase AC input at breaker/power switch	30 A, all regions
Breaker/power switch rating	50 A

Ballast Output to Projection Head

Operating voltage range	18-46 VDC
Start-up voltage (open current)	125-155 VDC
Operating current range	50-180 A
Ripple	1% max @ 25°C
Control ports	Refer to *6.4.7 Control Port (From Ballast)* and *6.4.8 Ballast Ports*.

6.6 Lamps

Replace before times:

Ballast	CXL/CDXL Lamps (kW)	Lamp Life (hrs.)
3-Phase 7 kW	CXL/CDXL-20 (2.0)	3000
	CXL/CDXL-30 (3.0)	2000
	CXL/CDXL-45 (4.5)	600
	CXL/CDXL-60 (6.0)	600

NOTES: 1) *Current range shown includes "over-drive", which is 10% more than the original lamp rating.*
2) *Optimized brightness requires CDXL lamp.*

Type	Xenolite®
Stand-by lamp power level for 4.5/6.0	60% of lamp's maximum current rating
Stand-by lamp power level 2.0/3.0	75% of lamp's maximum current rating
Motorized adjustment of position	3-axis, 0.25" range for each

6.7 Reflectors

10,000 hours

6.8 Audible Noise

67.2 dBA maximum

6.9 Safety

- CAN/CSA C22.2 No. 60950-1-07, 2nd Edition
- UL 60950-1, 2nd Edition
- IEC 60950-1, 2nd Edition (2005)

6.10 EMC Emissions

- FCC CFR47, Part 15, Subpart B, Class A – Unintentional Radiators
- CISPR 22: EN55022: Class A – Radio disturbance characteristics for Information Technology Equipment (ITE)

6.11 EMC Immunity

- CISPR 24/ EN55024: All parts for immunity characteristics for Information Technology Equipment (ITE)

6.12 Operating Environment

Temperature	10°C to 35°C (50°F to 95°F)
Humidity (non-condensing)	20% to 80%
Altitude	0 – 3000 meters
Tilt, any angle	15° max.

6.12.1 Non-Operating Environment

Temperature	-25C to 65°C (-13°F to 149°F)
Humidity (non-condensing)	0% to 95%

6.12.2 Weight & Size

NOTES: 1) *Only applies to the product dimensions, but not to the product weight (since the installed weight of the product includes the heaviest lens, and all accessories).* **2)** *Excludes lens and cabling.* **3)** *All weights and dimensions subject-to-change.*

Standard Dimensions (Refer to *Section 6: Specifications*)

Product dimensions (W x L x H) without lens (including feet at minimum height position) and without handles	1257 mm x 684 mm x 577 mm 49.5” x 26.5” x 22.7”
Product dimensions (W x L x H) without lens (including feet at minimum height position) and handles	1362 mm x 800 mm x 577 mm 53.6” x 31.5” x 22.7”
Packaging dimensions (W x L x H) , shipped without lens attached	1650 mm x 1040 mm x 890 mm 65” x 41” x 35”

Shipping Weights

Projection Head	535 lb (242.7 kg)
Ballast	145 lb (66 kg)
FredFrame™	166 lb (76 kg)

Installed Weight

Projection Head	460 lb (209.1 kg)
Ballast	110 lb (50 kg)
FredFrame™	110 lb (50 kg)

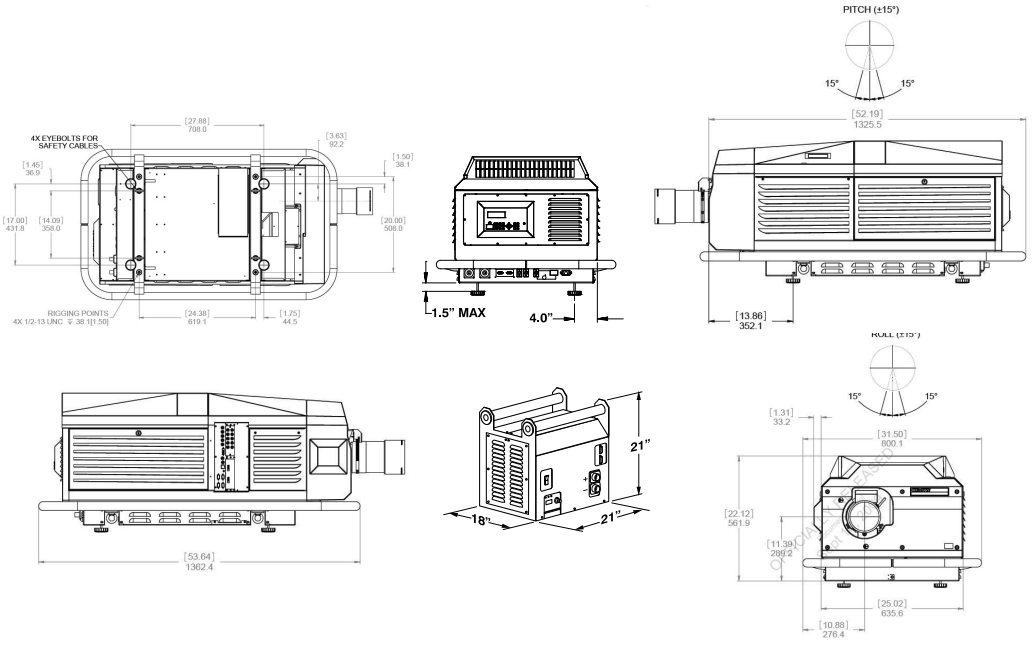


Figure 6-1 Overall Size Dimension

6.13 Standard and Optional Components

6.13.1 Standard (Sold with Product)

Projection head with built-in keypad and standard IR remote (configured for IR operation, batteries included)

25 ft cable for conversion of standard IR remote to wired operation

Line Cord, 10-foot, 15 amp, North American 220V

Face shield (required for lamp handling)

Dual SD/HD-SDI input module (38-804656-xx)

Roadie HD+35K User Manual

Misc. hardware, including Allen Keys

6.13.2 Optional (Sold Separately)

Projection Lenses

The projection head is compatible with the following optional lenses:

0.8:1 fixed throw ratio lens	113-104106-XX
1:1 fixed throw ratio lens	38-809071-XX
1.25 – 1.45:1	38-809073-XX
1.45 – 1.8:1	38-809074-XX
1.8 – 2.4:1	38-809075-XX
2.2 – 3.0:1	38-809076-XX
3.0 – 4.3:1	38-809077-XX
4.3 – 6.0 :1	38-809072-XX
5.5 – 8.5 :1	38-809078-XX
Motorized Auxillary Lens Mount	38-813019-XX
1.26x Anamorphic Lens	38-809054-XX

Lamp Ballasts

Remote Lamp ballast (7 kW)	38-814001-XX

Ballast (Remote) Cable Kits

2 meters (6½ ft.)	38-814003-XX
7.5 meters (25 ft.)	38-814004-XX
15 meters (50 ft.)	38-814005-XX
30 meters (100 ft.)	38-814006-XX

Other

Remote IR Sensor - communication cables	Ethernet, RS-232, and RS-422
Compact/Lite remote	03-900566-XX
Christie TWIST Module for arbitrary image warping and edge blending	108-103001-XX
FredFrame™ Rigging Frame	38-814007-XX
Rigging Clamps for flying projection head by handles	113-102101-XX
10-Bit KoRE Librarian Setup Software	Website download (password required)
High-contrast internal aperture kit	38-813028-XX
Analog and Digital Input Modules	Refer to *Section Appendix D: Optional Input Modules*
Xenon Lamp	2 kW, 3 kW, 4.5 kW, and 6 kW
Service Manual	020-100341-XX

Appendix A: Serial Communication Cables

A.1 Serial Links to Projector

A.1.1 General Communications

A serial link of RS-232 or RS-422 enables ASCII communication with the projector so that it can be controlled remotely from a PC or other controller. From a PC, connect a standard 9-wire RS-232 serial cable to the RS232 IN port located on the side of the projection head. Or, for long-distance (>100 ft.) links with an RS-422-compatible PC or controller, connect RS-422 cable to an RS422 port located on the side or rear panel of the projection head.

A.1.2 Software Downloads

Downloading new software to the projector requires RS-232 or RS-422 connected to the 9-pin connectors on the side of the projector only—do not download using either of the 6-pin XLR RS-422 ports located at the rear of the projector.

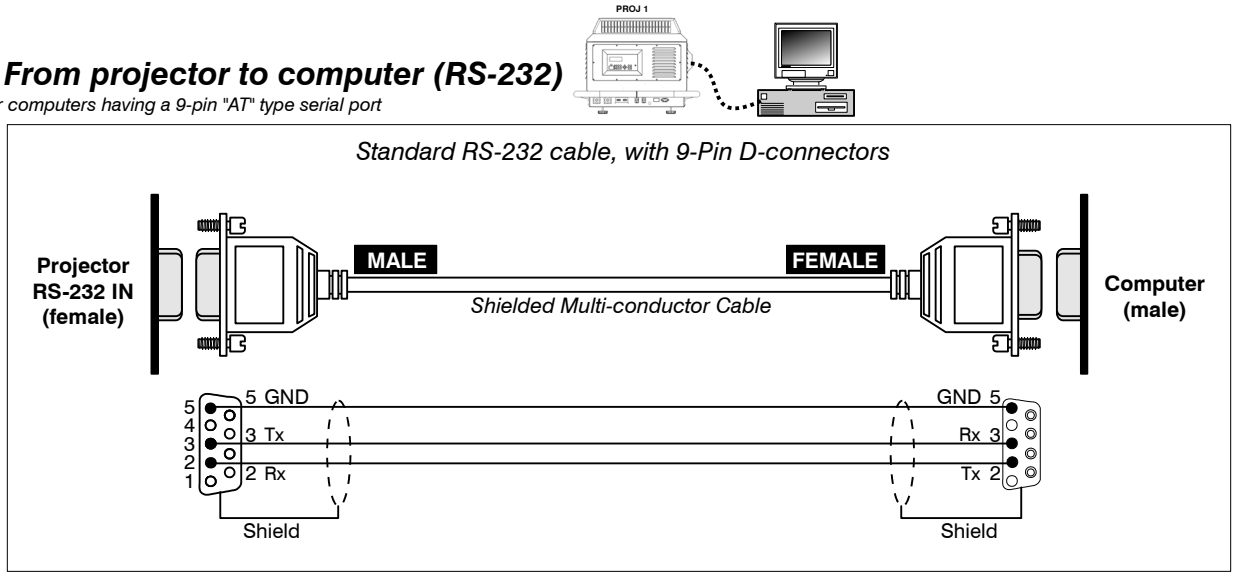
NOTE: *Using a rear RS-422 port (6-pin XLR) or Ethernet link for downloading new software to the projector is not supported.*

A.1.3 RS-422 Connections

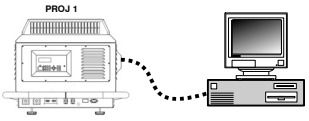
Depending on your RS-422-compatible device or RS-232 – RS-444 converter, the cabling wiring can vary, and may require a custom cable. There is no single standard pinout for RS-422.

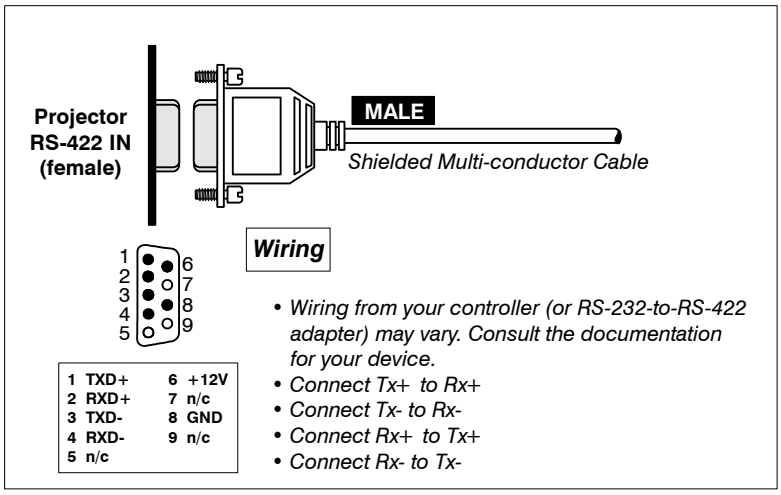
☐ ***From projector to computer (RS-232)***

For computers having a 9-pin "AT" type serial port



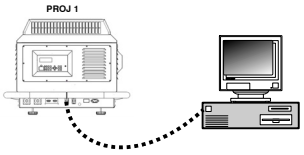
☐ *From projector (side) to RS-422 compatible computer*



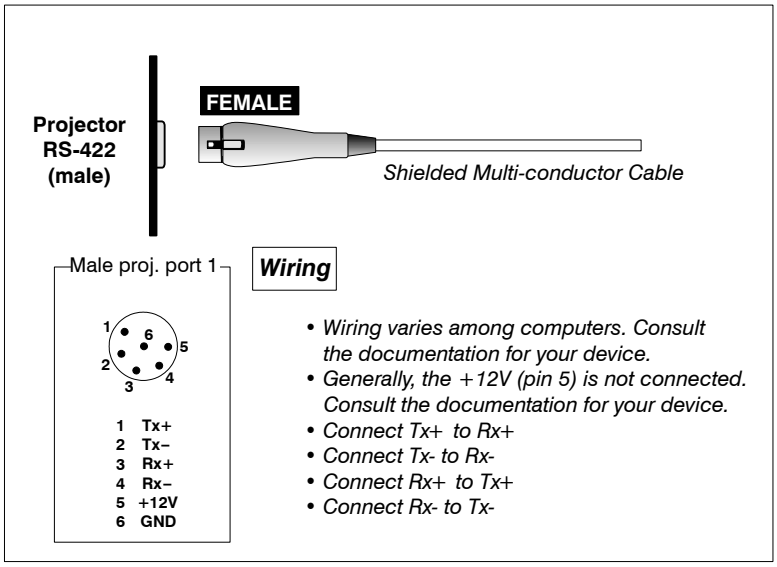


- *Wiring from your controller (or RS-232-to-RS-422 adapter) may vary. Consult the documentation for your device.*
- *Connect Tx+ to Rx+*
- *Connect Tx- to Rx-*
- *Connect Rx+ to Tx+*
- *Connect Rx- to Tx-*

☐ *From projector (rear) to RS-422 compatible computer*

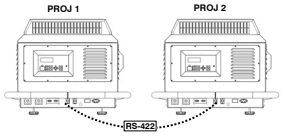


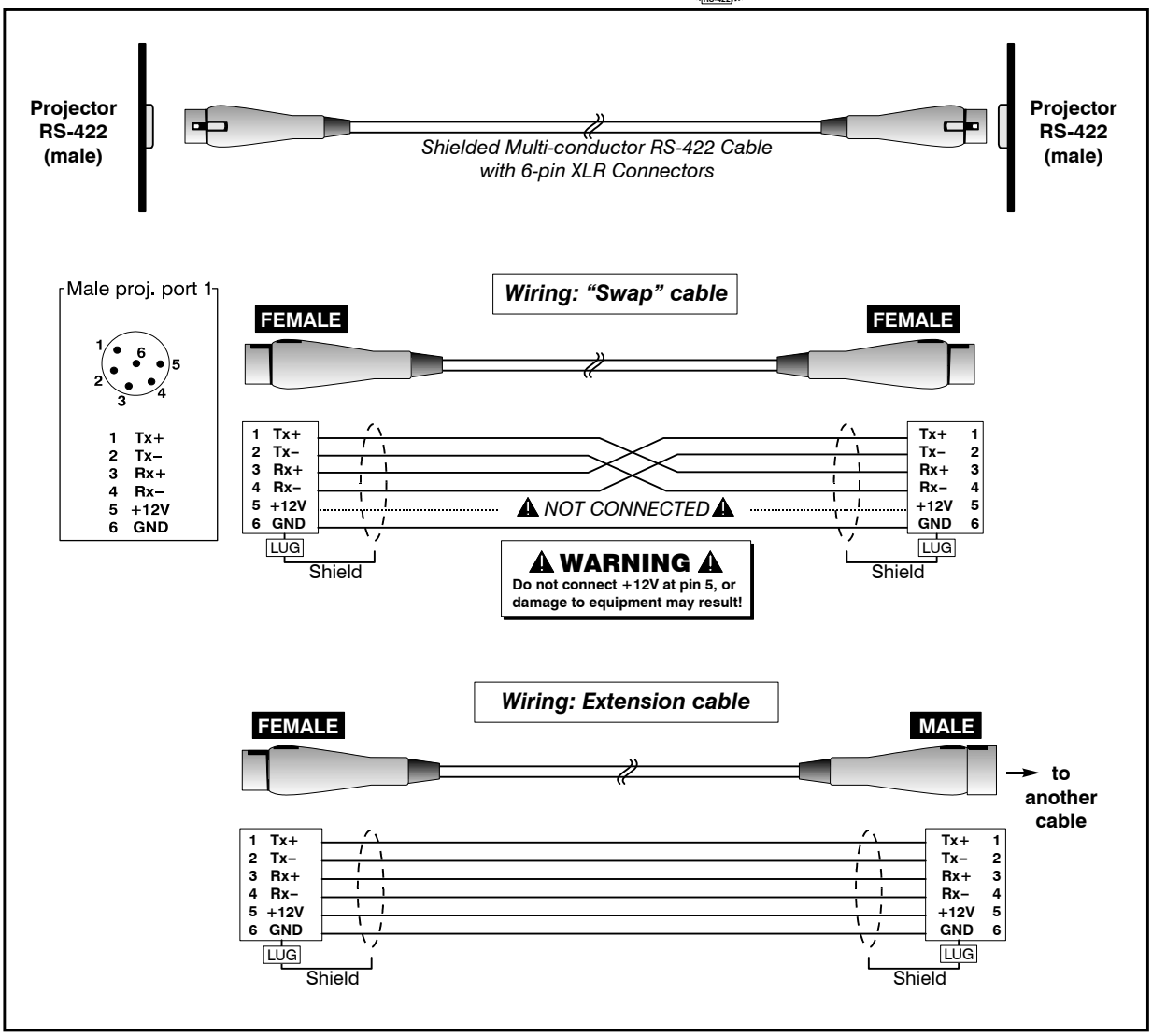
⚠ IMPORTANT ⚠
Not for software downloads.

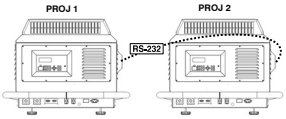


- *Wiring varies among computers. Consult the documentation for your device.*
- *Generally, the +12V (pin 5) is not connected. Consult the documentation for your device.*
- *Connect Tx+ to Rx+*
- *Connect Tx- to Rx-*
- *Connect Rx+ to Tx+*
- *Connect Rx- to Tx-*

☐ *From projector to projector via RS-422*

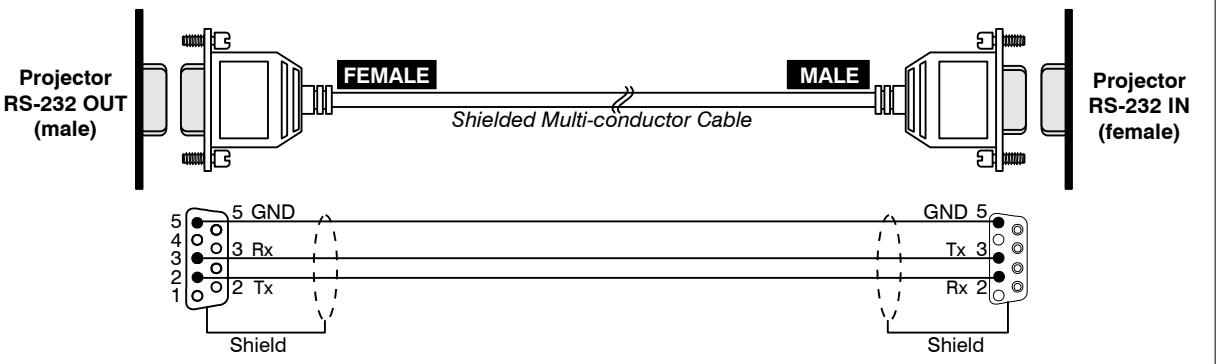






☐ *From projector to projector via RS-232*

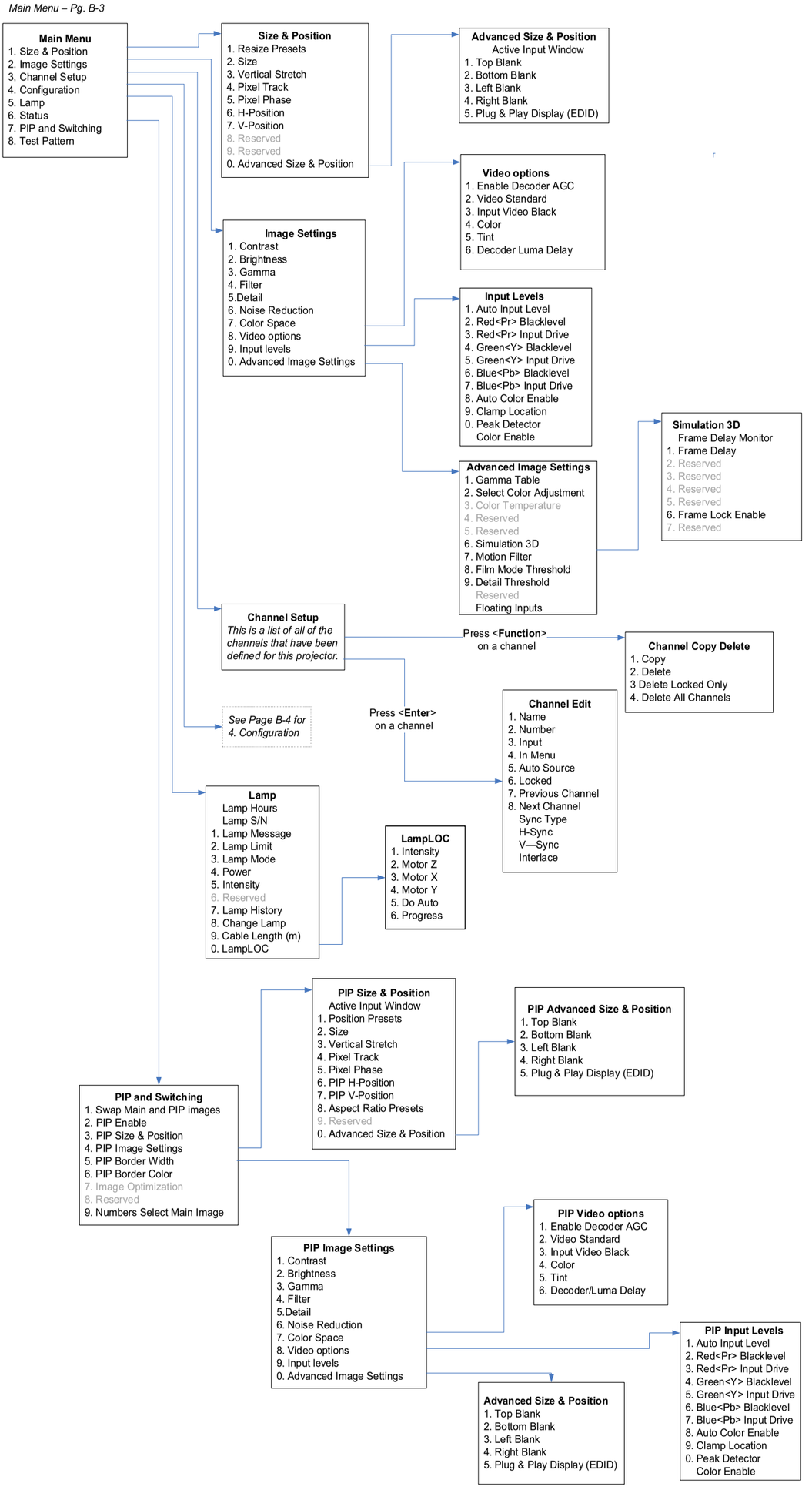
Standard RS-232 cable,with 9-Pin D Connectors

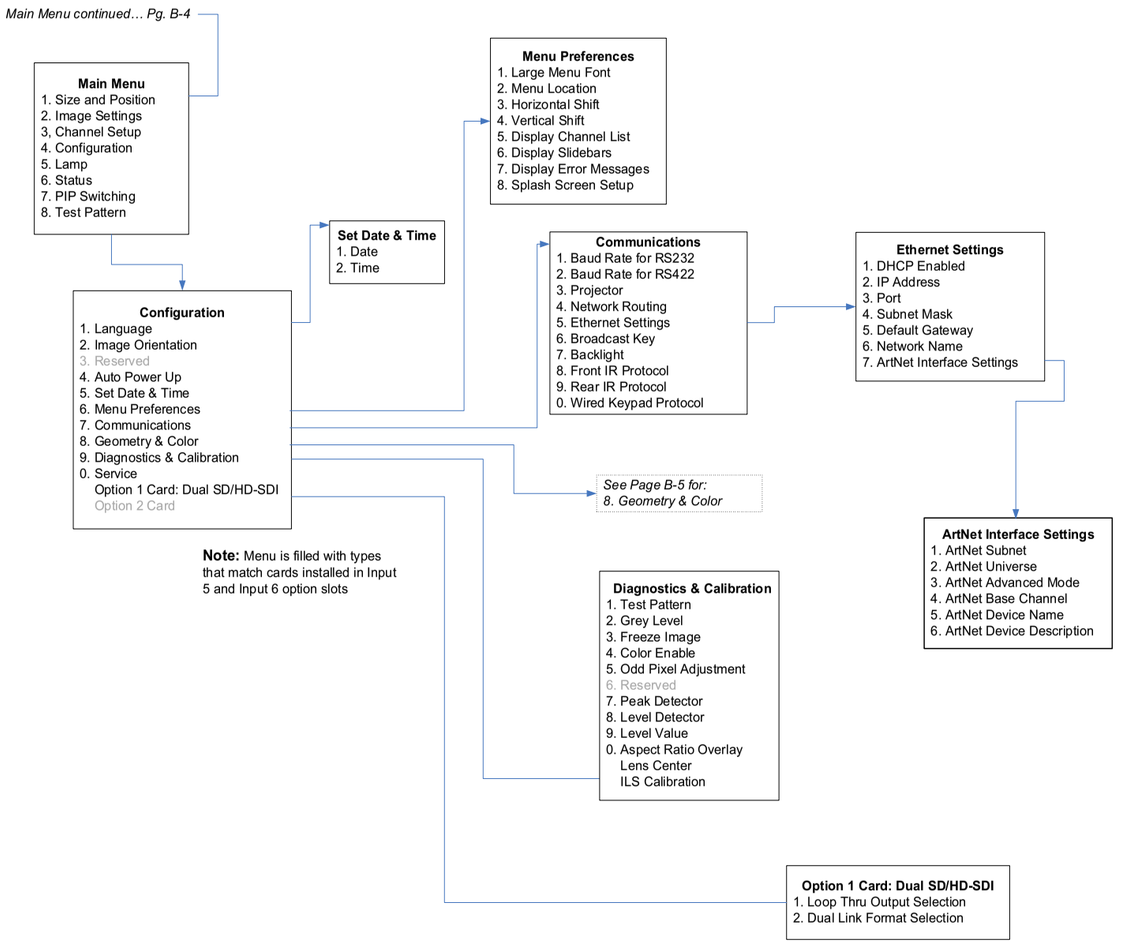


Appendix B: Menu Tree

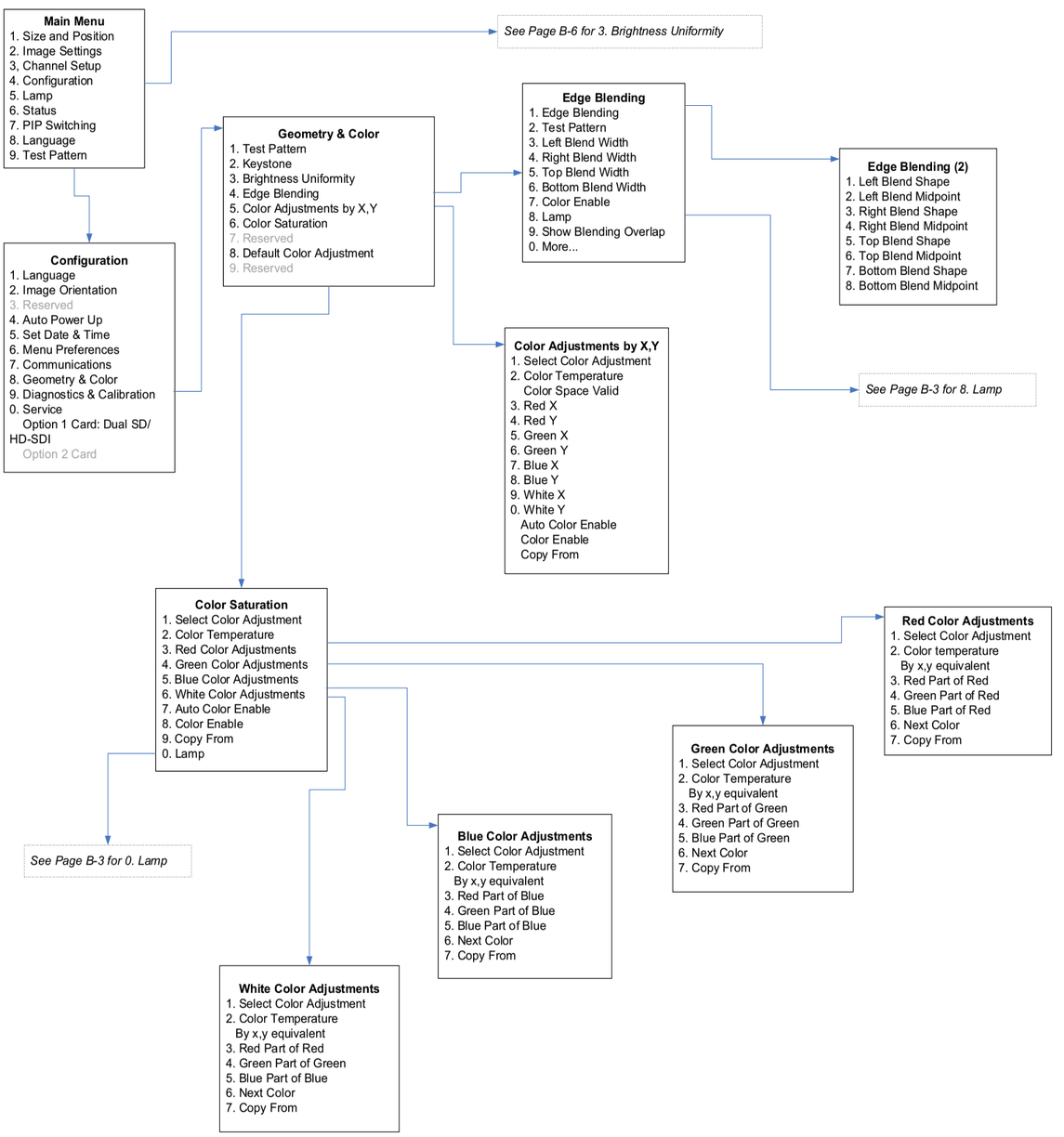
B.1 OnScreen Menu Tree

Provides a graphical representation of the software menu structure for the Roadie HD+35K. This allows you to quickly locate and navigate to a specific menu, and associated options/secondary menus.


Main Menu – Pg. B-3
Main Menu
1. Size & Position
2. Image Settings
3, Channel Setup
4. Configuration
5. Lamp
6. Status
7. PIP and Switching
8. Test Pattern
Size & Position
1. Resize Presets
2. Size
3. Vertical Stretch
4. Pixel Track
5. Pixel Phase
6. H-Position
7. V-Position
8. Reserved
9. Reserved
0. Advanced Size & Position
Advanced Size & Position
Active Input Window
1. Top Blank
2. Bottom Blank
3. Left Blank
4. Right Blank
5. Plug & Play Display (EDID)
Video options
1. Enable Decoder AGC
2. Video Standard
3. Input Video Black
4. Color
5. Tint
6. Decoder Luma Delay
Image Settings
1. Contrast
2. Brightness
3. Gamma
4. Filter
5.Detail
6. Noise Reduction
7. Color Space
8. Video options
9. Input levels
0. Advanced Image Settings
Input Levels
1. Auto Input Level
2. Red<Pr> Blacklevel
3. Red<Pr> Input Drive
4. Green<Y> Blacklevel
5. Green<Y> Input Drive
6. Blue<Pb> Blacklevel
7. Blue<Pb> Input Drive
8. Auto Color Enable
9. Clamp Location
0. Peak Detector
Color Enable
Simulation 3D
Frame Delay Monitor
1. Frame Delay
2. Reserved
3. Reserved
4. Reserved
5. Reserved
6. Frame Lock Enable
7. Reserved
Advanced Image Settings
1. Gamma Table
2. Select Color Adjustment
3. Color Temperature
4. Reserved
5. Reserved
6. Simulation 3D
7. Motion Filter
8. Film Mode Threshold
9. Detail Threshold
Reserved
Floating Inputs
Channel Setup
This is a list of all of the channels that have been defined for this projector.
Press <Function> on a channel
Channel Copy Delete
1. Copy
2. Delete
3 Delete Locked Only
4. Delete All Channels
See Page B-4 for 4. Configuration
Press <Enter> on a channel
Channel Edit
1. Name
2. Number
3. Input
4. In Menu
5. Auto Source
6. Locked
7. Previous Channel
8. Next Channel
Sync Type
H-Sync
V—Sync
Interlace
Lamp
Lamp Hours
Lamp S/N
1. Lamp Message
2. Lamp Limit
3. Lamp Mode
4. Power
5. Intensity
6. Reserved
7. Lamp History
8. Change Lamp
9. Cable Length (m)
0. LampLOC
LampLOC
1. Intensity
2. Motor Z
3. Motor X
4. Motor Y
5. Do Auto
6. Progress
PIP and Switching
1. Swap Main and PIP images
2. PIP Enable
3. PIP Size & Position
4. PIP Image Settings
5. PIP Border Width
6. PIP Border Color
7. Image Optimization
8. Reserved
9. Numbers Select Main Image
PIP Size & Position
Active Input Window
1. Position Presets
2. Size
3. Vertical Stretch
4. Pixel Track
5. Pixel Phase
6. PIP H-Position
7. PIP V-Position
8. Aspect Ratio Presets
9. Reserved
0. Advanced Size & Position
PIP Advanced Size & Position
1. Top Blank
2. Bottom Blank
3. Left Blank
4. Right Blank
5. Plug & Play Display (EDID)
PIP Image Settings
1. Contrast
2. Brightness
3. Gamma
4. Filter
5.Detail
6. Noise Reduction
7. Color Space
8. Video options
9. Input levels
0. Advanced Image Settings
PIP Video options
1. Enable Decoder AGC
2. Video Standard
3. Input Video Black
4. Color
5. Tint
6. Decoder/Luma Delay
PIP Input Levels
1. Auto Input Level
2. Red<Pr> Blacklevel
3. Red<Pr> Input Drive
4. Green<Y> Blacklevel
5. Green<Y> Input Drive
6. Blue<Pb> Blacklevel
7. Blue<Pb> Input Drive
8. Auto Color Enable
9. Clamp Location
0. Peak Detector
Color Enable
Advanced Size & Position
1. Top Blank
2. Bottom Blank
3. Left Blank
4. Right Blank
5. Plug & Play Display (EDID)

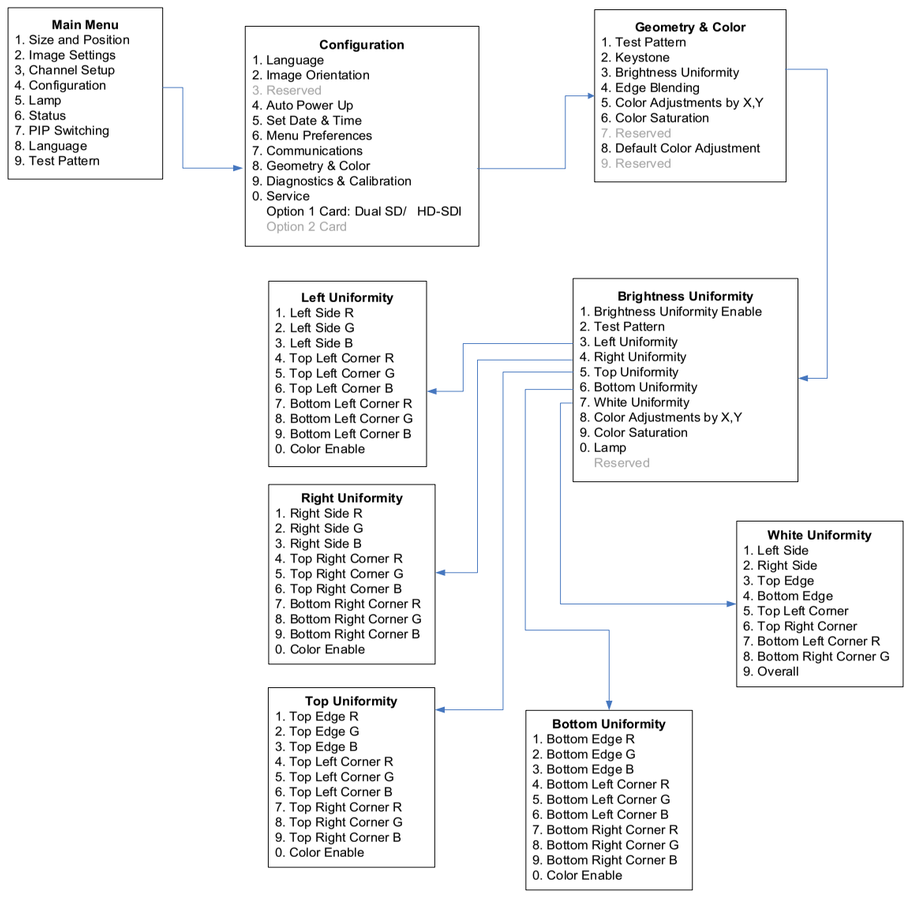

Main Menu continued… Pg. B-4
Main Menu
1. Size and Position
2. Image Settings
3, Channel Setup
4. Configuration
5. Lamp
6. Status
7. PIP Switching
8. Test Pattern
Menu Preferences
1. Large Menu Font
2. Menu Location
3. Horizontal Shift
4. Vertical Shift
5. Display Channel List
6. Display Slidebars
7. Display Error Messages
8. Splash Screen Setup
Set Date & Time
1. Date
2. Time
Communications
1. Baud Rate for RS232
2. Baud Rate for RS422
3. Projector
4. Network Routing
5. Ethernet Settings
6. Broadcast Key
7. Backlight
8. Front IR Protocol
9. Rear IR Protocol
0. Wired Keypad Protocol
Ethernet Settings
1. DHCP Enabled
2. IP Address
3. Port
4. Subnet Mask
5. Default Gateway
6. Network Name
7. ArtNet Interface Settings
Configuration
1. Language
2. Image Orientation
3. Reserved
4. Auto Power Up
5. Set Date & Time
6. Menu Preferences
7. Communications
8. Geometry & Color
9. Diagnostics & Calibration
0. Service
Option 1 Card: Dual SD/HD-SDI
Option 2 Card
See Page B-5 for:
8. Geometry & Color
ArtNet Interface Settings
1. ArtNet Subnet
2. ArtNet Universe
3. ArtNet Advanced Mode
4. ArtNet Base Channel
5. ArtNet Device Name
6. ArtNet Device Description
Note: Menu is filled with types that match cards installed in Input 5 and Input 6 option slots
Diagnostics & Calibration
1. Test Pattern
2. Grey Level
3. Freeze Image
4. Color Enable
5. Odd Pixel Adjustment
6. Reserved
7. Peak Detector
8. Level Detector
9. Level Value
0. Aspect Ratio Overlay
Lens Center
ILS Calibration
Option 1 Card: Dual SD/HD-SDI
1. Loop Thru Output Selection
2. Dual Link Format Selection

Main Menu continued… pg. B-5



Appendix B - Menu Tree

Main Menu continued… pg. B-6

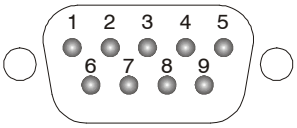


Appendix C: System Integration

C.1 Introduction

The GPIO connector located on the side input panel provides a flexible method of interfacing a wide range of external I/O devices to the projector, usually so that an event on one device automatically triggers an event on the other. There are 7 GIO pins available on the 9pin D-Sub GPIO connector, which are configurable via RS-232 commands. The other two pins are reserved for ground and power. The table below provides pin identification.

GPIO



GPIO Pins	
Pin #	**Signal**
1	+ 12V (200mA)
2	GPIO 1
3	GPIO 2
4	GPIO 3
5	Ground
6	GPIO 4
7	GPIO 5
8	GPIO 6
9	GPIO 7

The serial cable required for connecting the external device to the projector's GPIO connector, whether it's a standard serial cable or a custom one, must be compatible with the external device.

C.1.1 Configuring the GPIO

The GPIO connector is most easily configured with the KoRe 10-bit Librarian software. The **RTE** tab within the KoRe 10-bit Librarian user interface provides a graphical Helper to aid in the setup of the GPIO. In addition, Real-Time events can be used to trigger different GPIO output states when certain events occur. Refer to ***KoReLibrarian*** and the ***Serial Protocol manual*** for more details.

The GPIO connector can be configured to automate any number of events using the serial command code GIO. Each pin is defined as either an ***input*** or ***output*** depending on the desired outcome. In general, configure the pin as an input if you want the projector to respond to something an external device does, and as an output if you want the external device to respond to an action taken by the projector. For example, configure the pin as an output if you want the lighting in a room to automatically dim when the projector is turned ON.

A GIO command can also set the state of each pin as ***high*** or ***low***. By default, the state of each pin is ***high.*** The voltage applied to pins in the *high* state is + 3.3V.

Example 1.

Turn room lighting on when the projector is turned OFF. (Assumes a control/automation unit is configured to turn the lights on when pin 2 of its input goes hi(12-2009)gh.)

(GIO C2 O)	Set pin #2 configuration to output
(GIO 2 H)	Set pin #2 to high (state)

C.1.2 Query Command

(GIO?)	Request the state and configuration of all pins
(GIO! “HHLLHLH” “OOIOOOI”)	Reply of pin state and configuration
(GIO? C2)	Request configuration for pin #2
(GIO! C2 O)	Reply with pin #2 configuration as output
(GIO? 2)	Request the state of pin #2
(GIO! H)	Reply with pin #2 state as high

C.1.3 Real Time Event

Use the serial command **RTE** to specify an action that is initiated at a particular time or based on an external stimulus.

For General Purpose IO “G”

Parameter	Name	Value
P1	RTE type	G (Real Time I/O Event)
P2	I/O bit	1-7
P3	Pin state (1 Character) (String)	H = High L = Low “LHXXXHLX” Combine multiple inputs and trigger occurs when all conditions are met
P4	Commands	Any valid serial protocol command for the device

Example 2.

Projector powers up when a switch on the external device is turned ON.

(GIO C2 I)	Set pin #2 configuration as input
(RTE G 2 H “(PWR 1)”)	Power on when pin #2 set to high
(RTE G 2 L “(PWR 0)”)	Power off when pin #2 set to low

Appendix D: Optional Input Modules

The following optional input modules are currently available, and can be installed in either option slot in the projector (**INPUT 5** or **INPUT 6**). Contact your dealer for a complete and up-to-date listing.

NOTE: *Any audio connectors shown are non-functional in this projector.*

D.1 DVI Input Module

This module can display digital video input signals conforming to the DVI (Digital Visual Interface) single-channel standard.

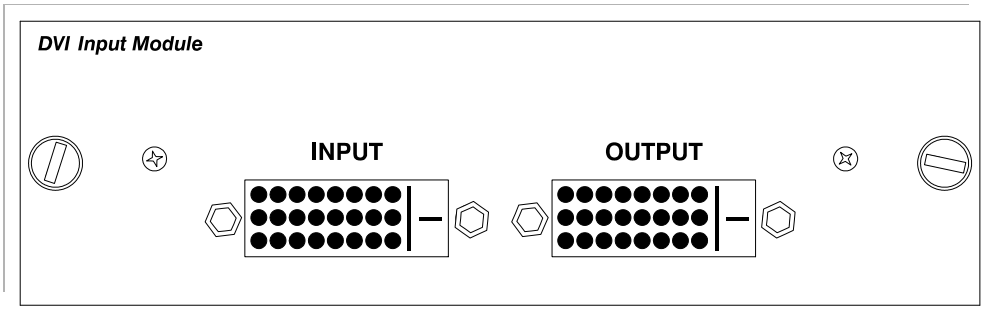


Figure D-1 DVI Input Module

Features

- Supports Digital Visual Interface (DVI) single-channel
- Supports VESA® Extended Display Identification Data (EDID™)
- Provides an active-loop-through using a DVI connector (conforming to the DVI Specification)

D.2 Dual SD/HD-SDI Module

NOTE: *Standard with this projector.*

This module accepts one or two independent standard- or high-definition serial digital inputs, decodes them for processing in the main electronics of the projector, and outputs 10-bit RGB/YCbCr 4:2:2 video. Either input can be set as the active primary or secondary part of a Picture-in-Picture display, and either input can be looped through to one (or both) of the module's BNC outputs.

Refer to *Section 2.5 Connecting Sources* for more information.

NOTE: *Older Input cards not listed may be supported by the Roadie HD+35K.*

Corporate offices

USA – Cypress
ph: 714-236-8610

Canada – Kitchener
ph: 519-744-8005

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ph: +44 118 977 8000

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France
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Hungary/Eastern Europe
ph: +36 (0) 1 47 48 100

Singapore
ph: +65 6877 8737

Shanghai
ph: +86 21 6278 7708

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Korea
ph: +82 2 702 1601

Japan
ph: +81 3 3599 7481

ISO 9001 ISO 14001

For the most current technical documentation, please visit www.christiedigital.com

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